

# **NATIONAL RADIATOR CORPORATION**

**THE MARK OF QUALITY PRODUCTS**



# NATIONAL RADIATOR CORPORATION

GENERAL OFFICES  
JOHNSTOWN, PA.

## THE INSTITUTION BEHIND THE PRODUCT

THE NATIONAL RADIATOR CORPORATION is among the oldest manufacturers of radiators, boilers and air conditioning equipment. A plumbing shop in 1879 — a large corporation with many manufacturing plants, warehouses and branch sales offices today. This expansion with constant increasing sales volume results from the acceptance of practical experience behind tested quality products.

THE NATIONAL RADIATOR CORPORATION has been a leader in the heating industry. It was the first to offer tube type radiation . . . the first to successfully use push nipple construction in radiation . . . the first to develop an all cast iron convactor and the first to offer a



truly artistic small tube type radiator. The many other contributions its engineers have made toward advancing the boiler and radiator industry are legend.

Today the NATIONAL RADIATOR CORPORATION is ready to serve the architect and engineer with a staff of representatives who have made a complete study of the design, application and performance of convectors, steel boilers, gas boilers, oil heating units and air conditioning equipment. Each is a specialist in his particular field supported by a thorough understanding of heating problems gained through years of experience. They are at your service.

## NATIONAL SERVICE THROUGH THESE BRANCH OFFICES AND WAREHOUSES

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\*Steel Boilers Only



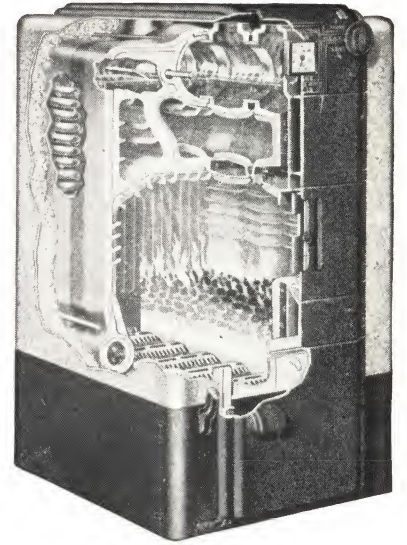
## NATIONAL BONDED HEAT EXTRACTOR BOILER—FOR HAND FIRING



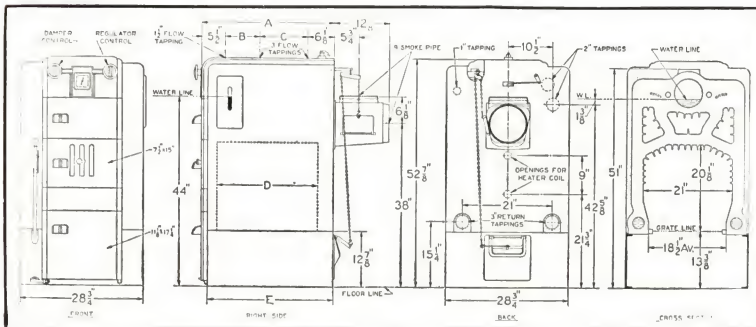
The National Multi-finger Heat Extractor Boiler is not "just another boiler" revamped from an older model to provide something new to sell, but has been designed to meet a definite need.

Specialized boilers for oil and stoker firing have been developed during recent years to meet the desire for automatic heating. Due to changes in the relative costs of different kinds of fuels, owners often wish to change from one fuel to another or, from hand firing to automatic firing. The specialized boiler did not always permit such a change, or if it did, great expense and the sacrifice of efficiency was involved.

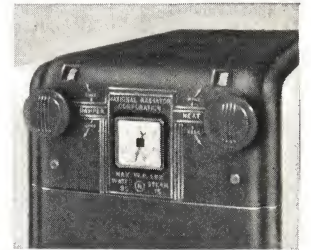
In designing the National Multi-finger Heat Extractor Boiler, National's engineers first determined the requisites of a boiler to operate efficiently when hand-fired, when stoker-fired and when used with an oil burner. The requisites of these three types of boilers were combined in the Multi-finger Heat Extractor Boiler, which is really three boilers in one, assuring the purchaser that he will obtain high efficiency regardless of which method of firing he may select.



### Dimensions



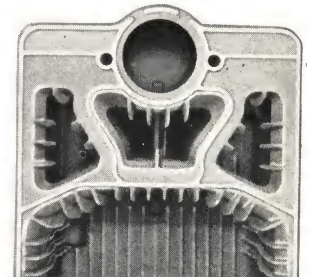
*Draft regulating devices are adjusted on the radio dial principle. Control knobs operate indicating dials which bear number graduations to show the relative setting of the damper regulator and smokehood damper.*



### SIZES AND RATINGS

Boiler No.		A	B	C	D	E	No. and size of tappings		
Steam	Water						Flow	Return	
AH-4-S	AH-4-W	18 7/8"	7 1/4"	...	11 1/2"	17 1/4"	1-1 1/2"	1-3"	2-3"
AH-5-S	AH-5-W	22 7/8"	11 1/4"	...	15 1/2"	21 1/4"	1-1 1/2"	1-3"	2-3"
AH-6-S	AH-6-W	26 7/8"	15 1/4"	...	19 1/2"	25 1/4"	1-1 1/2"	1-3"	2-3"
AH-7-S	AH-7-W	30 7/8"	8"	11 1/4"	23 1/2"	29 1/4"	1-1 1/2"	2-3"	2-3"
AH-8-S	AH-8-W	34 7/8"	8"	15 1/4"	27 1/2"	33 1/4"	1-1 1/2"	2-3"	2-3"
AH-9-S	AH-9-W	38 7/8"	8"	19 1/4"	31 1/2"	37 1/4"	1-1 1/2"	2-3"	2-3"
AH-10-S	AH-10-W	42 7/8"	8"	23 1/4"	35 1/2"	41 1/4"	1-1 1/2"	2-3"	2-3"

*Unusual shape of the flueways provides a large ratio of perimeter or surface to area, with a large proportion of the surface at the top where the gases are hottest.*



*A light step on the foot treadle and the ashpit door swings open. The large door makes the removal of ashes easy. A light push and the door closes — held fast by an invisible lock.*

### Steam Boilers

Boiler No.	Available output rating, sq. ft.	Bonded load rating, sq. ft.	Grate area, sq. ft.	Fuel capacity, lbs.	Fuel available, lbs.	Outlets number and size, in.	Inlets number and size, in.	Chimney	
								Size, in.	Height, ft.
AH-4-S	450	225	1.70	120	94	1-3	2-3	8x8	30
AH-5-S	630	315	2.25	167	130	1-3	2-3	8x8	30
AH-6-S	800	400	2.80	214	166	1-3	2-3	8x12	35
AH-7-S	980	490	3.35	261	202	2-3	2-3	8x12	35
AH-8-S	1150	575	3.90	308	238	2-3	2-3	8x12	35
AH-9-S	1330	665	4.45	355	274	2-3	2-3	8x12	35
AH-10-S	1500	750	5.00	402	310	2-3	2-3	8x12	35

### Water Boilers

Boiler No.	Available output rating, sq. ft.	Bonded load rating, sq. ft.	Grate area, sq. ft.	Fuel capacity, lbs.	Fuel available, lbs.	Outlets number and size, in.	Inlets number and size, in.	Chimney Size, in.	Height, ft.
AH-4-W	720	360	1.70	120	94	1-1 1/2" & 1-3"	2-3	8x8	30
AH-5-W	1000	500	2.25	167	130	1-1 1/2" & 1-3"	2-3	8x8	30
AH-6-W	1280	640	2.80	214	166	1-1 1/2" & 1-3"	2-3	8x12	35
AH-7-W	1560	780	3.35	261	202	1-1 1/2" & 2-3"	2-3	8x12	35
AH-8-W	1840	920	3.90	308	238	1-1 1/2" & 2-3"	2-3	8x12	35
AH-9-W	2120	1060	4.45	355	274	1-1 1/2" & 2-3"	2-3	8x12	35
AH-10-W	2400	1200	5.00	402	310	1-1 1/2" & 2-3"	2-3	8x12	35

For complete information request catalogue Form 292-A.



# NATIONAL BONDED HEAT EXTRACTOR BOILER — FOR MECHANICAL FIRING

## SERIES AM — STOKER FIRED — SIZES AND RATINGS

Boiler No.		Available output rating			Bonded Load Rating		Combustion chamber volume from bottom of sections to crown, cu. ft.	Minimum recommended coal input per hour	
Steam	Water	B.t.u.	Steam, sq. ft.	Water, sq. ft.	Steam, sq. ft.	Water, sq. ft.		B.t.u.	Lbs.
AM- 6-S	AM- 6-W	148,700	620	1055	430	690	4.7	228,700	19
AM- 7-S	AM- 7-W	175,700	725	1205	505	805	5.7	270,300	22
AM- 8-S	AM- 8-W	198,200	825	1350	575	920	6.7	304,800	25
AM- 9-S	AM- 9-W	226,200	930	1500	650	1035	7.7	348,000	28
AM-10-S	AM-10-W	248,600	1030	1645	720	1150	8.7	382,300	31

(1) Recommended inputs are based on anthracite coal of 12,500 B.t.u./lb.

## SERIES AO — OIL FIRED — SIZES AND RATINGS

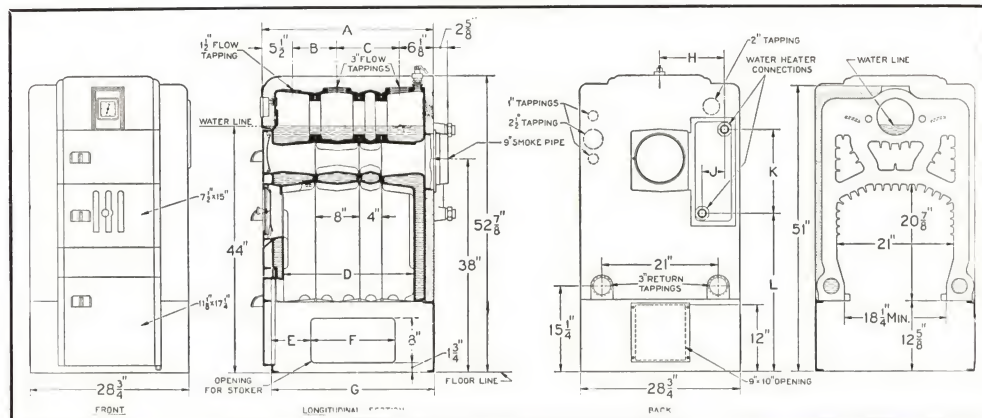
Boiler No.		Heating surface, sq. ft.	Available output rating			Bonded Load Rating		Minimum recommended oil input per hour		
Steam	Water		B.t.u.	Steam, sq. ft.	Water, sq. ft.	Steam, sq. ft.	Water, sq. ft.	B.t.u.	Lbs.	Gal.
AO- 5-S	AO- 5-W	27.8	125,300	520	910	360	575	165,800	8.7	1.18
AO- 6-S	AO- 6-W	32.8	148,700	620	1055	430	690	196,800	10.3	1.40
AO- 7-S	AO- 7-W	39.0	175,700	725	1205	505	805	234,200	12.2	1.66
AO- 8-S	AO- 8-W	44.0	198,200	825	1350	575	920	264,200	13.8	1.87
AO- 9-S	AO- 9-W	50.3	226,200	930	1500	650	1035	301,400	15.7	2.13
AO-10-S	AO-10-W	55.3	248,600	1030	1645	720	1150	331,400	17.3	2.35

(1) Available output ratings are figured on 4500 B.t.u. per hour per square foot of heating surface heat transmission rate.

(2) The Bonded Load Ratings represent the actual installed cast iron radiation plus the domestic hot water load. To express water heater load in terms of square feet of radiation, figure each gallon of storage tank capacity as equivalent to 1 sq. ft. of steam radiation or 1.6 sq. ft. of hot water radiation. If Biltin Tankless Heater is used add 50 sq. ft. steam radiation or 80 sq. ft. water radiation per bathroom to installed radiation before selecting boiler size. Allowance for piping and pick-up is made in the Bonded Load Ratings for average installations. If piping load is excessive, additional allowance should be made.

(3) Minimum recommended oil input is based on oil of 19,200 B.t.u. per lb. and 7.35 lbs. per gal.

## Dimensions



Boiler No.		A	B	C	D	*E	*F	G	No. and size of tappings		
Steam	Water								Flow	Return	
AO-5-S	AO-5-W	22 7/8"	11 1/4"	.....	15 1/2"	.....	.....	21 1/4"	1-1 1/2"	1-3"	2-3"
AO or AM- 6-S	AO or AM- 6-W	26 7/8"	15 1/4"	.....	19 1/2"	5 1/8"	15 1/4"	25 1/4"	1-1 1/2"	1-3"	2-3"
AO or AM- 7-S	AO or AM- 7-W	30 7/8"	8"	11 1/4"	23 1/2"	7 1/8"	15 1/4"	29 1/4"	1-1 1/2"	2-3"	2-3"
AO or AM- 8-S	AO or AM- 8-W	34 7/8"	8"	15 1/4"	27 1/2"	5 5/8"	22 1/4"	33 1/4"	1-1 1/2"	2-3"	2-3"
AO or AM- 9-S	AO or AM- 9-W	38 7/8"	8"	19 1/4"	31 1/2"	7 5/8"	22 1/4"	37 1/4"	1-1 1/2"	2-3"	2-3"
AO or AM-10-S	AO or AM-10-W	42 7/8"	8"	23 1/4"	35 1/2"	9 5/8"	22 1/4"	41 1/4"	1-1 1/2"	2-3"	2-3"

\*Stoker boilers only.

## WATER HEATERS

Hand Fired Boilers (steam only): No. 757 storage type heater is furnished as standard equipment. Nos. 904, 907 and 1213 storage type are furnished as optional at extra cost.

Stoker and Oil Fired: No. 904 storage type heater furnished as standard equipment. Nos. 907 and 1213 storage type and two sizes of tankless type heaters are available as optional equipment at extra cost. All sizes are Taco Heaters.

Ratings: No. 757, 40 gal. (boiler water 212° F.); No. 904, 44 gal.; No. 907, 100 gal.; and No. 1213, 160 gal. (boiler water 180° F.)

based 40° to 140° F. rise in three hours. Tankless: No. 1219, 180 gal.; No. 1219-A, 210 gal. in one hour based on 40° to 140° F. temperature rise with boiler water at 180° F.

## DIMENSIONS IN INCHES

	Medium capacity No. 904	High capacity No. 907	Tankless
H	11 5/16"	11 5/16"	11 5/16"
J	3 1/2"	4 1/8"	4 1/8"
K	9 3/8"	15"	15"
L	33 13/16"	28 3/16"	28 3/16"
Size of connections	3/4"	1"	3/4"



Series AM



Series AO



Observation Port  
Series AO



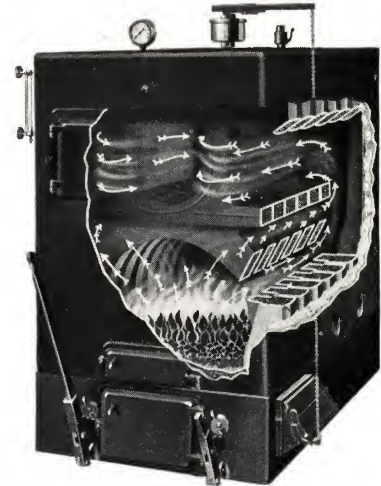
Series AM and AO



## NATIONAL BONDED JACKETED BOILER — No. 4 SERIES



A bond by a nationally known, independent surety company is issued with National cast iron boilers. It contains four distinct guaranteed stipulations as to the performance, manufacture, testing and replacement of defective parts. In order to remove any uncertainty regarding the amount of direct cast iron radiation which each National Bonded Boiler is guaranteed to heat, the net radiator loads under the heading "Bonded Direct Cast Iron Radiation," are shown herein. An allowance for normal piping is included in the bonded load. If the surface of the piping exceeds 25% of the Direct Cast Iron Radiation for steam or 35% for water, additional allowance should be made for the extra surface. The bonded loads have been established on the basis that 1 sq. ft. of direct cast iron steam radiation will emit 240 B.t.u. per hour and that 1 sq. ft. of hot water radiation will emit 150 B.t.u. per hour.



RATINGS AND BOILER DATA — STEAM AND WATER

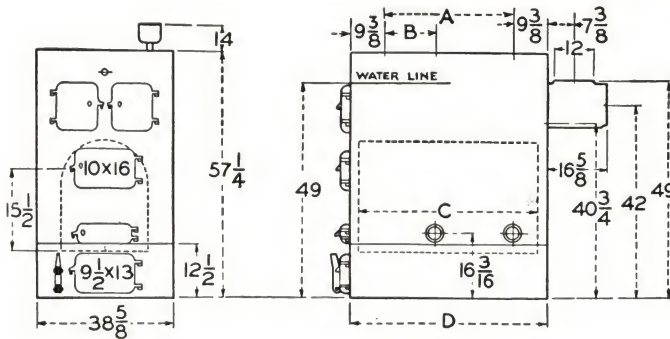
Steam			Water			General (Steam and Water)					
Boiler No.	Available output rating, sq. ft.	Bonded direct cast iron radiation, sq. ft.	Boiler No.	Available output rating, sq. ft.	Bonded direct cast iron radiation, sq. ft.	Grate area, sq. ft.	Fuel capacity, lbs.	Outlets, number and size	Inlets, number and size	Chimney	
4-S-5	1,475	700	4-W-5	2,400	1,150	4.78	324	2-4"	2-4"	12 x 12	30
4-S-6	1,800	875	4-W-6	2,900	1,440	5.95	403	2-4"	2-4"	12 x 12	35
4-S-7	2,125	1,050	4-W-7	3,500	1,730	7.12	482	3-4"	4-4"	12 x 12	35
4-S-8	2,450	1,225	4-W-8	4,000	2,020	8.29	561	3-4"	4-4"	12 x 12	40
4-S-9	2,775	1,400	4-W-9	4,500	2,310	9.46	640	3-4"	4-4"	12 x 16	45

The number of square feet of direct cast iron radiation each boiler is bonded to heat is listed under the heading "Bonded Direct Cast Iron Radiation, Square Feet." For comparison with similarly rated boilers "Available Output" ratings are also shown.

Distance from center of one section to center of section next to it 6 $\frac{3}{8}$  in.

Return Inlet Tappings: One on each side of next-to-back section "RU." Additional inlet tappings on each side of intermediate outlet section "R" in 7, 8, and 9 section boilers.

DIMENSIONS — STEAM AND WATER



Boiler No.		A	B	C	D
4-S-5	4-W-5	13 $\frac{3}{4}$ "	...	28 $\frac{1}{8}$ "	33 $\frac{1}{4}$ "
4-S-6	4-W-6	20 $\frac{5}{8}$ "	...	35"	40 $\frac{1}{8}$ "
4-S-7	4-W-7	27 $\frac{1}{2}$ "	13 $\frac{3}{4}$ "	42 $\frac{7}{8}$ "	47"
4-S-8	4-W-8	34 $\frac{3}{8}$ "	13 $\frac{3}{4}$ "	49 $\frac{3}{8}$ "	53 $\frac{3}{8}$ "
4-S-9	4-W-9	41 $\frac{1}{4}$ "	20 $\frac{5}{8}$ "	56 $\frac{5}{8}$ "	60 $\frac{3}{4}$ "

Measurements are subject to slight variations in assembly.

Indirect External Water Heater Tapping: One 2-in. tapping located in rear of back boiler section. Bosses for additional 1 $\frac{1}{2}$ -in. tappings located on both sides of all intermediate sections on line with lower gauge cock tapping can be furnished.

## NATIONAL BONDED SECTIONAL AND SUPER-SMOKELESS BOILERS

The National line of unjacketed, sectional cast iron boilers begins with the Novus 25 series which is the same as the No. 4 Series Jacketed boiler, except that it is fitted with an overhead damper control and is shipped less the jacket.

Series 32 boilers are similar to Series 33 Super-Smokeless boilers, ratings and measurements for which are shown on the following page, except that Series 32 boilers are not fitted with smokeless device. Bonded ratings range from 1,200 to 2,400 sq. ft. for steam and 1,980 to 3,960 for water.

Series 42 boilers are similar to Series 40 Super-Smokeless boilers, ratings and measurements for which are shown on the second following page, except that Series 42 boilers are not fitted with smokeless device. Bonded ratings range from 2,200 to 6,700 sq. ft. for steam and 3,625 to 11,000 sq. ft. for water.

National Novus Series 48 boilers are furnished in both

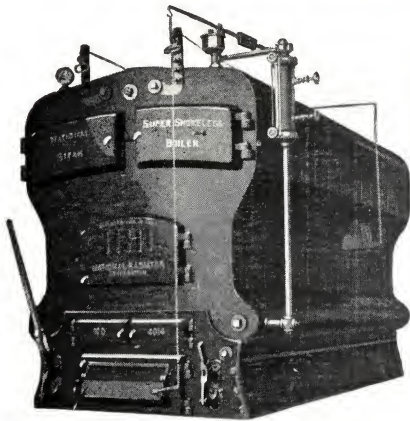
the hard coal and Super-Smokeless types. Bonded ratings for hard coal type ranges from 3,500 to 7,000 sq. ft. for steam and 5,750 to 11,500 sq. ft. for water. Bonded ratings for Super-Smokeless type range from 4,200 to 9,000 sq. ft. for steam and 6,900 to 14,700 sq. ft. for water.

National Duplex Super-Smokeless boiler has the same smokeless appliance as Series 40 Super-Smokeless. The duplex series is really two Series 40 boilers joined with special plate work. Bonded ratings range from 5,600 to 16,600 sq. ft. for steam and 9,220 to 27,390 sq. ft. for water.

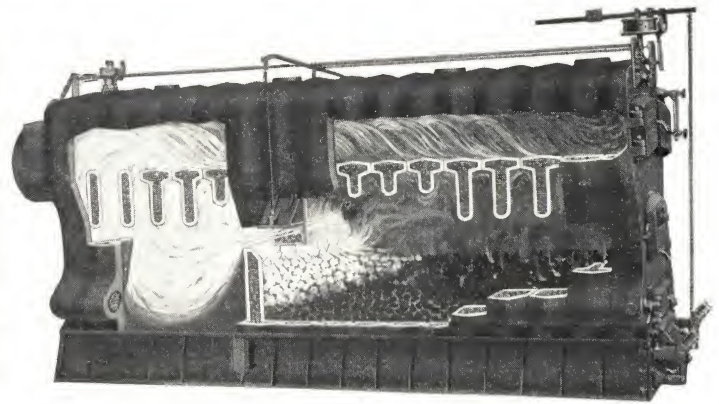
National Low Water Line Boiler is made in two series — both in hard coal and smokeless types. Water line of Series 30 is 43 in. and bonded ratings range from 850 to 2,600 sq. ft. for steam and 1,400 to 4,305 sq. ft. for water. Series 40 boilers have a water line of 47 in. and bonded ratings from 1,800 to 6,600 sq. ft. for steam and 2,970 to 10,890 sq. ft. for water.



## NATIONAL SUPER-SMOKELESS BOILERS — SERIES 33 AND 40



Secondary air is pre-heated while passing through patented air gate section. It is mixed intimately with the hot gases, being delivered in fine, high velocity jets distributed across full width of firebox. The pre-heated air causes gases to burn at very high temperatures.



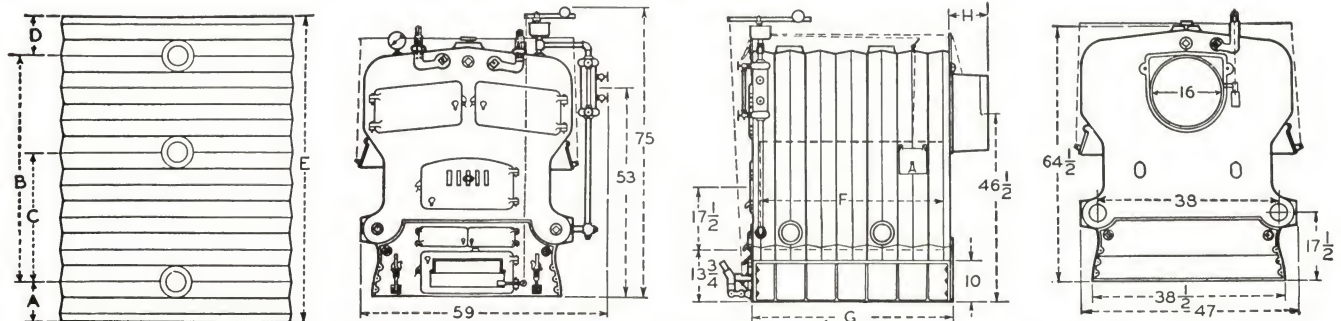
SERIES No. 33 — STEAM, VAPOR AND WATER — RATINGS AND BOILER DATA

Steam				Water				General (Steam and Water)				
Boiler No.	Available output rating, sq. ft.	Bonded direct cast iron radiation, sq. ft.	Inlets, number and size	Boiler No.	Available output rating, sq. ft.	Bonded direct cast iron radiation, sq. ft.	Inlets, number and size	Grete area, sq. ft.	Outlets, number and size	Chimney		† Covering surface, sq. ft.
										Area, in.	Height, ft.	
S-335	2,900	1,300	2-4"	W-335	4,650	2,150	2-4" 2-5"	7.32	1-5"	14 x 14	40	42
S-336	3,600	1,650	2-4"	W-336	5,800	2,725	2-4" 2-5"	9.10	2-5"	15 x 15	40	51
S-337	4,300	2,000	2-4"	W-337	6,950	3,300	2-4" 2-5"	10.87	2-5"	16 x 16	40	60
S-338	5,000	2,350	2-4"	W-338	8,100	3,875	2-4" 2-5"	12.65	2-5"	16 x 16	50	69
S-339	5,700	2,700	2-4"	W-339	9,250	4,450	2-4" 2-5"	14.42	3-5"	18 x 18	50	78
S-3310	6,400	3,050	2-4"	W-3310	10,400	5,025	2-4" 2-5"	16.20	3-5"	18 x 18	55	87

The square feet of direct cast iron radiation each boiler is bonded to heat is listed under the heading "Bonded Direct Cast Iron Radiation, Square Feet." For comparison with similarly rated boilers "Available Output" ratings are also shown.

† Square feet of exterior boiler surface. Approximately 60 lbs. of insulation per section required to cover boiler 1½ in. thick. 100 lbs. of insulation will cover approximately 15 sq. ft. of boiler surface to a thickness of 1½ in.

### DIMENSIONS — STEAM AND WATER



Boiler No.	A	B	C	D	E	F	G	H
335	18 5/8"	16 1/2"	.....	18 5/8"	37 1/4"	39 1/2"	38 1/4"	10 1/2"
336	10 3/8"	16 1/2"	.....	18 5/8"	45 1/2"	40 3/4"	46 1/2"	10 1/2"
337	10 3/8"	24 3/4"	.....	18 5/8"	53 3/4"	49"	54 3/4"	10 1/2"
338	10 3/8"	24 3/4"	.....	26 7/8"	62"	57 1/4"	63"	10 1/2"
339	10 3/8"	49 1/2"	24 3/4"	10 3/8"	70 1/4"	65 1/2"	71 1/2"	10 1/2"
3310	10 3/8"	57 3/4"	24 3/4"	10 3/8"	78 1/2"	73 3/4"	79 1/2"	10 1/2"

Measurements subject to slight variations in assembly. Distance from center of one section to center of section next to it is 8¼ in.

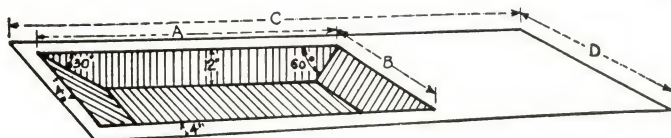
Steam Return Inlet Tappings: Two 4-in. in rear of back section "B." Side return inlets on steam boilers are only furnished on special order.

Water Return Inlet Tappings: Two 4-in. in rear of back

section "B." Additional 5-in. return inlets on each side of intermediate supply outlet section "HR."

Indirect External Water Heater Tapping: One 2-in. tapping located in rear of back boiler section. Bosses for additional 1½-in. tappings located on both sides of all intermediate sections on line with lower gauge cock tapping can be furnished.

### ASH PIT RECOMMENDATIONS, STEAM AND WATER



The tables give all the necessary measurements for pitting the National Super-Smokeless Boiler. Letters refer to corresponding letters on the diagram.

Boiler No.	Measurement of pit under ash pit		Dimensions of Foundation	
	A	B	C	D
335	34"	33 1/2"	43"	41 1/2"
336	42 1/4"	33 1/2"	51 1/4"	41 1/2"
337	50 1/2"	33 1/2"	59 1/2"	41 1/2"
338	58 3/4"	33 1/2"	67 3/4"	41 1/2"
339	67"	33 1/2"	76"	41 1/2"
3310	75 1/4"	33 1/2"	84 1/4"	41 1/2"



## NATIONAL BONDED SUPER-SMOKELESS BOILERS — SERIES 40

## RATINGS AND BOILER DATA — STEAM AND WATER

Steam				Water				General (Water and Steam)				
Boiler No.	Available output rating, sq. ft.	Bonded direct cast iron radiation, sq. ft.	Inlets, number and size	Boiler No.	Available output rating, sq. ft.	Bonded direct cast iron radiation, sq. ft.	Inlets, number and size	Grate area, sq. ft.	Outlets, number and size	Chimney		Covering surface, sq. ft.
										Area, in.	Height, ft.	
S-406	5,200	2,300	2-4"	W-406	8,300	3,795	2-4" 2-5"	12.03	2-5"	16 x 16	50	56
S-407	6,200	2,800	2-4"	W-407	9,900	4,620	2-4" 2-5"	14.38	3-5"	18 x 18	50	66
S-408	7,200	3,300	2-4"	W-408	11,500	5,445	2-4" 2-5"	16.73	3-5"	18 x 18	55	76
S-409	8,200	3,800	2-4"	W-409	13,100	6,270	2-4" 2-5"	19.08	3-5"	20 x 20	55	86
S-4010	9,200	4,300	2-4"	W-4010	14,700	7,095	2-4" 2-5"	21.43	3-5"	20 x 20	60	96
S-4011	10,200	4,800	2-4"	W-4011	16,300	7,920	2-4" 2-5"	23.77	3-5"	21 x 21	60	106
S-4012	11,200	5,300	2-4"	W-4012	17,900	8,745	2-4" 4-5"	21.43	4-5"	22 x 22	65	116
S-4013	12,200	5,800	2-4"	W-4013	19,500	9,570	2-4" 4-5"	21.43	4-5"	22 x 22	70	126
S-4014	13,000	6,300	2-4"	W-4014	20,800	10,395	2-4" 4-5"	23.77	4-5"	23 x 23	75	136
S-4015	13,800	6,800	2-4"	W-4015	22,100	11,220	2-4" 4-5"	23.77	4-5"	23 x 23	75	146
S-4016	14,600	7,300	2-4"	W-4016	23,400	12,045	2-4" 4-5"	23.77	4-5"	24 x 24	80	156
S-4017	15,400	7,800	2-4"	W-4017	24,700	12,870	2-4" 4-5"	23.77	4-5"	24 x 24	80	166
S-4018	16,200	8,300	2-4"	W-4018	26,000	13,695	2-4" 4-5"	23.77	4-5"	25 x 25	80	176

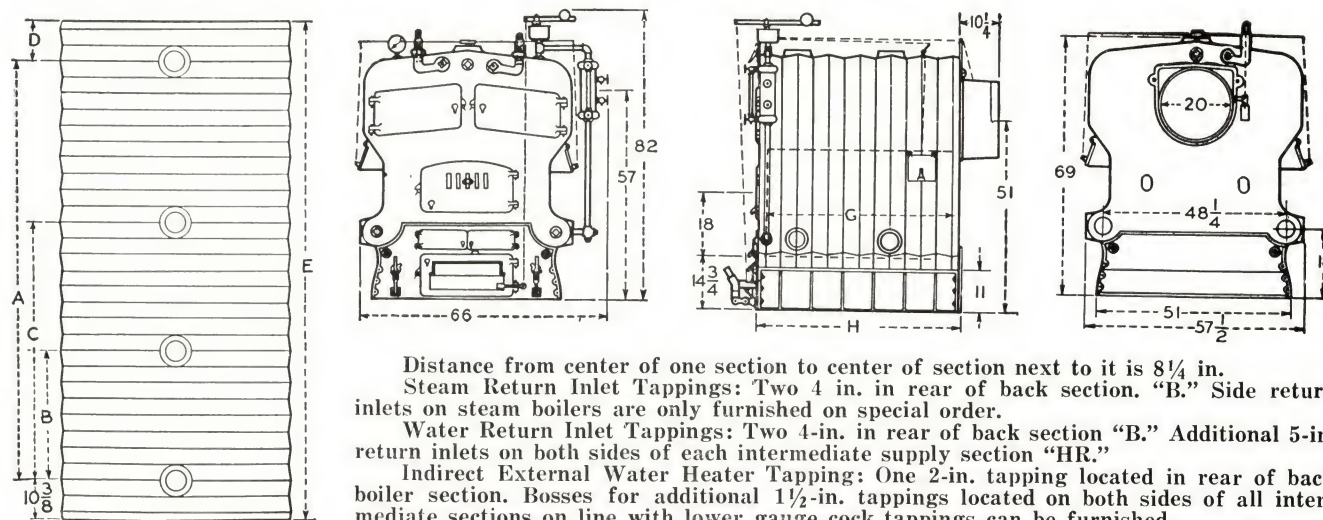
The number of square feet of direct cast iron radiation each boiler is bonded to heat is listed under the heading "Bonded Direct Cast Iron Radiation, Square Feet." For comparison with similarly rated boilers "Available Output"

ratings are also shown.

†Square feet of exterior boiler surface.

Approximately 67 lbs. of insulation per section required to provide boiler covering 1½ in. thick.

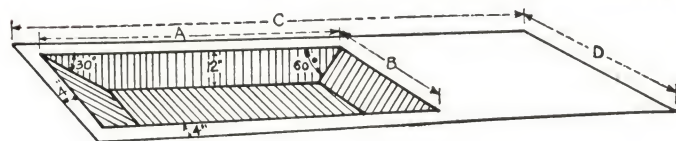
## DIMENSIONS — STEAM AND WATER



Boiler No.	A	B	C	D	E	G	H
406	24¾	16½	...	10¾	45½	40¾	47
407	33	16½	...	10¾	53¾	49	55¼
408	41¼	24¾	...	10¾	62	57¼	63¾
409	49½	33	...	10¾	70¼	65½	71¾
4010	57¾	33	...	10¾	78½	73¾	80
4011	57¾	33	...	18½	86¾	82	88¼
4012	74¼	33	57¾	10¾	95	73¾	96½
4013	74¼	33	57¾	18½	103¼	73¾	104¾
4014	82½	41¼	66	18½	111½	82	113
4015	90¾	41¼	66	18½	119¾	82	121¼
4016	99	41¼	66	18½	128	82	129½
4017	107¼	41¼	66	18½	136¼	82	137¾
4018	115½	41¼	66	18½	144½	82	146

Measurements subject to slight variations in assembly.

## ASH PIT FOUNDATION RECOMMENDATIONS — STEAM AND WATER



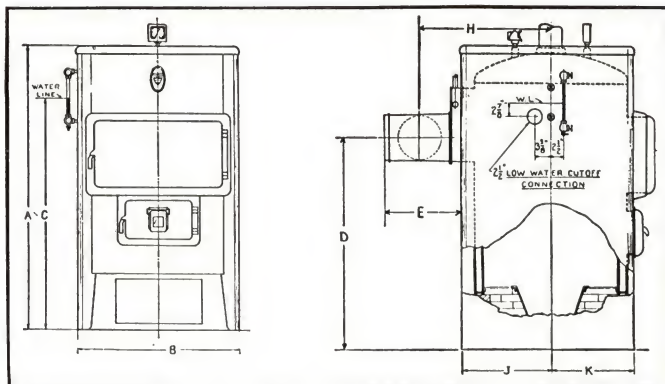
Tables give all necessary measurements for pitting the National Super-Smokeless Boiler. Letters refer to corresponding letters on diagram.

When boiler is erected before basement floor is laid, surround pit with foundation 10 to 12 in. wide.

Boiler No.	Measurement of pit under ash pit		Dimensions of foundation	
	A	B	C	D
406	42¼"	46"	51¼"	54"
407	50½"	46"	59½"	54"
408	58¾"	46"	67¾"	54"
409	67"	46"	76"	54"
4010	75¼"	46"	84¼"	54"
4011	83½"	46"	92½"	54"
4012	75¼"	46"	100¾"	54"
4013	75¼"	46"	109"	54"
4014	83½"	46"	117¼"	54"
4015	83½"	46"	125½"	54"
4016	83½"	46"	133¾"	54"
4017	83½"	46"	142"	54"
4018	83½"	46"	150¼"	54"



# NATIONAL PREMIER VERTICAL STEEL BOILERS—STOKER AND OIL FIRED TYPES FOR RESIDENTIAL USE



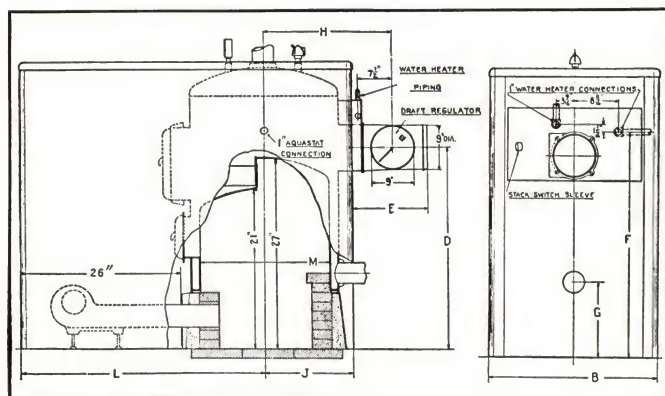
**Standard Equipment**—Base assembled, fire and flue doors with frames, No. 66DB McDonnell & Miller low water cut-off, self-controlled draft adjuster, 1½-in. wash-out plugs, 2 aquastat tappings, turbulators, National pyrex observation port and No. 75 Taco storage type indirect hot water heater.

**Trimmings for Steam Boilers**—Steam gauge, water gauge, glass and gauge cocks and pop safety valve.

**Trimmings for Water Boilers**—Combination altitude gauge and thermometer. Knockout discs are provided in jackets opposite boiler tappings.



## Dimensions



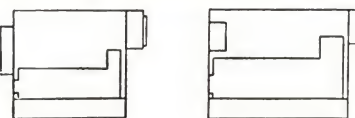
Measurements		Boiler VP23	Boiler VP26
A	Height overall	58"	58"
B	Width at base	34"	34"
C	Water line	47 1/2"	47 1/2"
D	Smoke outlet height	40 7/8"	40 7/8"
E	Smoke hood extension	15 1/4"	15 1/4"
F	Water heater—inlet connection	45 1/2"	45 1/2"
G	Return connection height	15 1/2"	15 1/2"
H	Distance side or top smoke outlet to center line of boiler	26 1/4"	26 1/4"
J	Jacket length—back end—regular and DeLuxe	17 3/4"	17 3/4"
K	Jacket length—front end—regular	16 1/4"	16 1/4"
L	Jacket length—front end—DeLuxe	43"	43"
M	Boiler shell—inside diameter	23"	26"
	Smoke outlet diameter	9"	9"
	Steam or flow outlet size	4"	4"
	Return connection size	4"	4"
	Chimney size	9"	9"
	Chimney height	30'	35'
	Furnace volume, cu. ft.	6.3	7.4
	Heating surface, sq. ft.	33	40
	Outside surface to cover, sq. ft.	40	40

## RATINGS — HOT WATER HEATER CAPACITIES

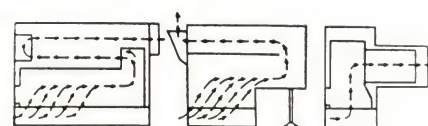
Boiler No.	*S.H.B.I. Rating		Indirect Water Heaters—Gallons Heated 40° F. to 140° F.					
			Storage Tank Type			Tankless Type		
	Steam, sq. ft.	Water, sq. ft.	No.	Per 3 hrs. in boiler water		No.	180° F. boiler water	
				212° F.	180° F.		1 hour	1 minute
VP-23	540	860	75	75	55	180	180	3.0
VP-26	680	1090	110	110	75			
			150	150	110			

## NATIONAL PREMIER COMMERCIAL SERIES STEEL BOILER FEATURES

**Recessed Front Chamber**—The hot gases, after passing to the front of the boiler, must reverse their direction in a smoke chamber. Manufacturing economies can be effected by making this chamber a projecting sheet metal box—but this construction wastes heat into the boiler room; while the projecting heat interferes with boiler tending. The National Premier has a flush front, with a recessed chamber, water-jacketed on five sides.

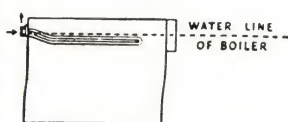


**Three-pass Flue Construction**—These diagrams illustrate the types of fire travel generally found in steel



boilers, and show at a glance the superiority of the National three-pass arrangement. In the one-pass boiler, the flue gases pass quickly through the boiler, and immediately reach the stack; the two-pass provides a longer travel. But only in the three-pass are the flue gases forced to take the long, circuitous route which will assure maximum heat transfer.

**Indirect Water Heater**—In the National Premier Steel Boiler, provision can be made for inserting the coils of an indirect water heater, if desired. Domestic water heating is thus handled by the boiler, saving a large part of the money otherwise spent for such service.



**True Arch Crown Sheet Construction**—The National Premier

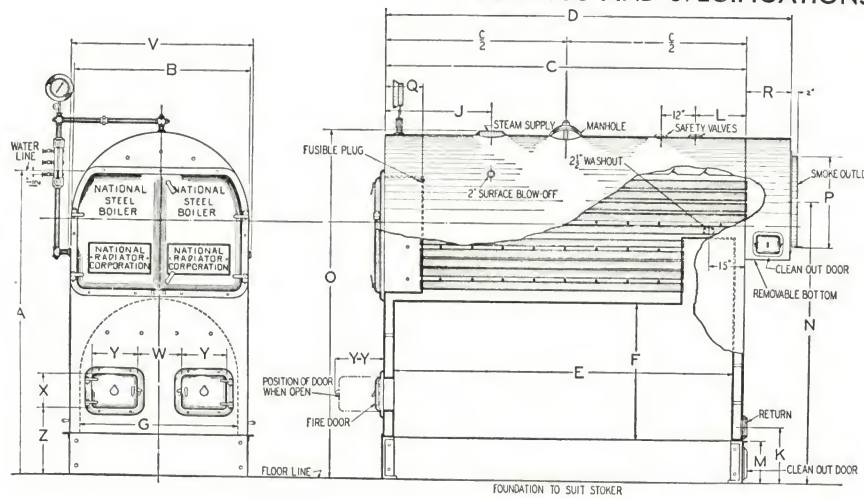
Steel Boiler has a True Arch crown sheet. Its advantages are obvious. The inverted, or bag type, may permit sludge and sediment to accumulate. Such an accumulation acts as an insulator. In True Arch construction, sediment cannot accumulate at the danger points.





# NATIONAL PREMIER STEEL BOILERS — COMMERCIAL SERIES

## RATINGS AND SPECIFICATIONS



All Commercial Series National Premier Steel Boilers are constructed for 15 lbs. steam or 30 lbs. water working pressure in accordance with the Steel Heating Boiler Code of the A.S.M.E. Special boilers can be built for 80 lbs. water working pressure. All ratings are in accordance with the Industry's Simplified Practice Recommendations R157-35, as issued by the U. S. Department of Commerce.

Other base heights available—Boilers No. 374 to 495, inclusive—15", 17", 18". Boilers No. 553 to 613, inclusive—17", 18". Boilers No. 673 to 855, inclusive—17", 18", 21". If these bases are substituted for base regularly supplied, increase all height dimensions accordingly.

**Standard Equipment**—All-metal base with or without front base panel; fire door, liner and frame; flue doors and frame; smokebox clean-out doors; tube scraper.

**Standard Trimmings**—Water column, water gauge and gauge cocks (no water column piping furnished); 5-in. diameter steam gauge and siphon with boilers up to and including 55 in. wide, 8½-in. diameter steam gauge and siphon with larger boilers; safety valve set to blow at 10 or 15-lb. pressure. No trimmings furnished with hot water boilers.

**Note**—Boilers 55 in. wide and larger have manhole in top of boiler. All boilers have hand-hole openings for cleaning purposes.

### TYPE MB—SOLID FUELS—STOKER FIRED

Boiler No.	*MB-317	*MB-318	MB-374	MB-375	MB-376	MB-434	MB-435	MB-436	MB-494	MB-495	MB-553	MB-554	MB-613	MB-673	MB-674	MB-733	MB-793	MB-854	MB-855
<b>S.H.B.I. Rating—</b>																			
Steam . . . . . sq. ft.	2190	2680	3160	3650	4250	4860	5470	6080	7290	8500	10330	12150	15180	18220	21250	24290	30360	36430	42500
Water . . . . . sq. ft.	3500	4280	5050	5840	6800	7770	8750	9720	11660	13600	16520	19440	24280	29150	34000	38860	48570	58280	68000
Heating surface . . . sq. ft.	129	158	186	215	250	286	322	358	429	500	608	715	893	1072	1250	1429	1786	2143	2500
Furnace volume . . . cu. ft.	17.6	21.4	25.3	29.2	34.0	38.9	43.8	48.7	58.4	68.0	82.7	97.2	121.5	145.8	170.0	194.3	242.9	291.5	340.0
A—Wat. line hgt. ft.-in.	4-10	4-10	5-10	5-11 ½	6-0	6-1 ½	6-2 ½	6-2 ½	7-1 ½	7-3	7-7 ½	7-10	8-11	9-1	9-4 ½	9-9	10-4	12-2	12-9
B—Boiler width . . . in.	31	31	37	37	37	43	43	43	49	49	55	55	61	67	67	73	79	85	85
C—Boiler length . ft.-in.	5-5 ¾	6-5 ¾	5-5 ¾	6-1 ¾	7-0 ¾	6-11 ¾	7-8 ¾	8-5 ¾	7-0 ¾	8-0 ¾	8-3 ¾	9-5 ¾	9-0 ¾	9-11 ¾	11-3 ¾	11-7 ¾	13-1 ¾	12-0 ¾	13-8 ¾
D—Boiler lgth. over all ft.-in.	6-6 ¾	7-6 ¾	6-5 ¾	7-1 ¾	8-0 ¾	7-11 ¾	8-8 ¾	9-5 ¾	8-2 ¾	9-2 ¾	9-5 ¾	10-7 ¾	10-3 ¾	11-3 ¾	12-7 ¾	13-3 ¾	14-9 ¾	13-8 ¾	15-4 ¾
E—Firebox lgth. ft.-in.	5-0 ½	6-0 ½	4-9 ½	5-5 ½	6-4 ½	6-3 ½	7-0 ½	7-9 ½	6-4 ½	7-7 ½	7-7 ½	8-9 ½	8-4 ½	9-3 ¾	10-8 ¼	10-11 ¾	12-5 ½	11-3 ½	12-11 ½
F—Firebox height . . in.	27	27	27 ½	29	29 ½	30 ½	31 ½	31 ½	35 ½	37	39 ½	42	47	49 ½	53	56 ½	63 ½	71 ½	78 ½
S.H.B.I. av. furnace height . . . . . in.	27.1	26.7	30.2	31.0	31.5	31.1	31.6	32.6	36.4	37.2	38.9	40.8	45.8	47.5	50.4	53.2	59.1	67.5	73.9
G—Firebox width . . in.	26	26	30	30	30	36	36	36	42	42	48	48	54	60	60	66	72	78	78
N—Smoke outlet, hgt. to c.l. . . . . ft.-in.	4-5 ½	4-5 ½	5-5 ½	5-7	5-7 ½	5-9 ½	5-10 ½	5-10 ½	6-9 ½	6-11	7-4 ½	7-7	8-4	8-8	8-11 ½	9-2 ½	9-10 ½	11-6 ½	12-1 ½
O—Boiler hgt. overall ft.-in.	5-7 ½	5-7 ½	6-8 ½	6-10	6-10 ½	7-2 ½	7-3 ½	7-3 ½	8-6 ½	8-8	9-0 ½	9-3	10-4	10-7	10-10 ½	11-3 ½	12-0 ½	13-11 ½	14-6 ½
Firedoor openings, number in boiler . .	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
W—Firedoor openings, Dist. between . . in.									6	6	10	10	16	20	20	24	30	34	34
X—Height of fire door opening . . . . . in.	12	12	10	10	10	10	10	10	12	12	12	12	12	12	12	12	12	12	12
Y—Width of fire door opening . . . . . in.	16	16	12	12	12	12	12	12	16	16	16	16	16	16	16	16	16	16	16
YY—Projection of fire door opening . . . in.	20 ¾	20 ¾	16 ½	16 ½	16 ½	16 ½	16 ½	16 ½	20 ¾	20 ¾	20 ¾	20 ¾	20 ¾	20 ¾	20 ¾	20 ¾	20 ¾	20 ¾	20 ¾

### TYPE OB—OIL FIRED

Boiler No.	*OB-317	*OB-318	OB-374	OB-375	OB-376	OB-434	OB-435	OB-436	OB-494	OB-495	OB-553	OB-554	OB-613	OB-673	OB-674	OB-733	OB-793	OB-854	OB-855
<b>S.H.B.I. Rating—</b>																			
Steam . . . . . sq. ft.	2190	2680	3160	3650	4250	4860	5470	6080	7290	8500	10330	12150	15180	18220	21250	24290	30360	36430	42500
Water . . . . . sq. ft.	3500	4280	5050	5840	6800	7770	8750	9720	11660	13600	16520	19440	24280	29150	34000	38860	48570	58280	68000
Heating surface . . . sq. ft.	129	158	186	215	250	286	322	358	429	500	608	715	893	1072	1250	1429	1786	2143	2500
Furnace volume . . . cu. ft.	15.7	19.2	22.6	26.1	30.4	34.8	39.1	43.5	52.1	60.8	73.8	86.8	108.5	130.2	151.8	173.5	216.9	260.3	333.6
A—Wat. line hgt. ft.-in.	4-10	4-10	5-8 ½	5-8 ½	5-8 ½	5-11	5-11	5-11	6-9	6-9	7-1	7-1	7-11	8-0	8-3 ½	8-5 ½	9-7 ½	9-7 ½	9-7 ½
B—Boiler width . . . in.	31	31	37	37	37	43	43	43	49	49	55	55	61	67	67	73	79	85	85
C—Boiler length . ft.-in.	5-5 ¾	6-5 ¾	5-5 ¾	6-1 ¾	7-0 ¾	6-11 ¾	7-8 ¾	8-5 ¾	7-0 ¾	8-0 ¾	8-4 ¾	9-8 ¾	9-3 ¾	10-2 ¾	11-11 ¾	11-11 ¾	13-7 ¾	12-6 ¾	14-4 ¾
D—Boiler lgth. over all ft.-in.	6-6 ¾	7-6 ¾	6-5 ¾	7-1 ¾	8-0 ¾	7-11 ¾	8-8 ¾	9-5 ¾	8-2 ¾	9-2 ¾	9-6 ¾	10-10 ¾	10-6 ¾	11-6 ¾	13-0 ¾	13-7 ¾	15-3 ¾	14-2 ¾	16-0 ¾
E—Firebox lgth. ft.-in.	5-0 ½	6-0 ½	4-9 ½	5-5 ½	6-4 ½	6-3 ½	7-0 ½	7-9 ½	6-4 ½	7-7 ½	7-7 ½	8-9 ½	8-4 ½	9-3 ¾	10-8 ¼	11-3 ¾	12-10 ¾	11-9 ¾	13-7 ¾
F—Firebox height . . in.	27	27	26	26	26	28	28	28	31	31	33	33	35	36 ½	36 ½	39	41	41	41
G—Firebox width . . in.	26	26	30	30	30	36	36	36	42	42	48	48	54	60	60	66	72	78	78
XY—Firedoor open. . in.	12x16	12x16	12x18	12x18	12x18	12x18	12x18	12x18	15x23	15x23	15x23	15x23	14x38	14x38	14x38	14x38	2-15x23	2-15x23	2-15x23

### GENERAL DATA—TYPES MB AND OB BOILERS

Boiler No.	*OB-317	*OB-318	OB-374	OB-375	OB-376	OB-434	OB-435	OB-436	OB-494	OB-495	OB-553	OB-554	OB-613	OB-673	OB-674	OB-733	OB-793	OB-854	OB-855
J—Steam outlet, size . . in.	6	6	6	6	6	6	6	6	8	8	8	8	8	8	8	8	10	10	10
K—Return inlet, size . . in.	24	24	24	24	26	24	24	26	30	36	30	34	24	24	26	42	46	36	46
L—Return inlet, location . in.	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	6	6	6
M—Return inlet, id'd for WB . in.	15	15	15	15	15	15	15	15	16	16	19	19	19	19	19	19	20	20	20
N—Safety valve, size . . in.	1 ½	1 ½	2	2	2	2	2	2 ½	2 ½	2 ½	3	3	2-2 ½	2-2 ½	2-2 ½	2-2 ½	2-2 ½	2-3	2-3
O—Safety valve, location . in.	15	15	18	18	18	18	18	18	18	18	20	20	20	20	20	18	18	18	18
P—Base height . . . . . in.	12	12	12	12	12	12	12	12	12	12	15	15	15	15	15	15	15	15	15
Q—Smoke outlet, diameter . in.	8x20 ½	8x20 ½	22	22	22	24	24	24	26	26	28	28	32	34	34	36	40	42	42
R—Smoke box, depth . . in.	6	6	9	9	9	10	10	10	11	11	11	11	12	12	12	13	14	14	14
S—Boiler width overall . in.	13	13	12	12	12	12	12	12	14	14	14	14	15	16	16	20	20	20	20
V—Firedoor openings, hgt. from f. l. . . . in.	32 ½	32 ½	39 ¼	39 ¼	39 ¼	45 ¼	45 ¼	45 ¼	51 ¼	51 ¼	57 ¾	57 ¾	63 ¾	69 ½	69 ½	75 ½	81 ¾	87 ¾	87 ¾
Breaching, diam. 1 boiler . in.	22	22	19	19	19	20	20	20	21	21	24	24	24	25	25	25	25 ½	25 ½	25 ½
Stack, diam. 1 boiler . . in.	16	16	22	22	22	24	24	24	26	26	28	28	32	34	34	36	40	42	42
Stack, height 1 boiler . . in.	45	45	50	50	50	55	55	55	60	60	65	65	70	70	70	80	90	100	110
Breaching, diam. 2 boilers . in.	22	22	30	30	30	34	34	34	38	38	40	44	46	50	50	52	56	56	58
Stack, diam. 2 boilers . . in.	22	22	28	28	28	31	31	31	34	34	36	36	40	42	46	48	54	54	56
Stack, height 2 boilers . . in.	50	50	60	60	60	65	65	65	70	70	75	75	80	80	80	100	100	110	110
Covering surface . . . . sq. ft.	68	78	79	89	102	109	121	133	129	146	165	191	212	242	281	298	364	403	472
Shipping wgt., approx. . lbs.	2550	2950	3900	4200	4700	5300	6000	6500	7100	8100	9500	10600	12300	14700	16900	19600	22800	28500	32600



## NATIONAL GAS BOILERS

### THE PRODUCT

The National Gas Boiler is designed to meet the well-defined demands imposed by the growing vogue of the basement room. Gas fuel, of course, by eliminating the need for a fuel bin and banishing dirt and odors, is the first step toward a real basement room. The National Gas Boiler goes the rest of the way . . . for it is a truly attractive piece of furniture, need not be partitioned off, and thus permits the maximum spaciousness and airiness which is a prime essential.

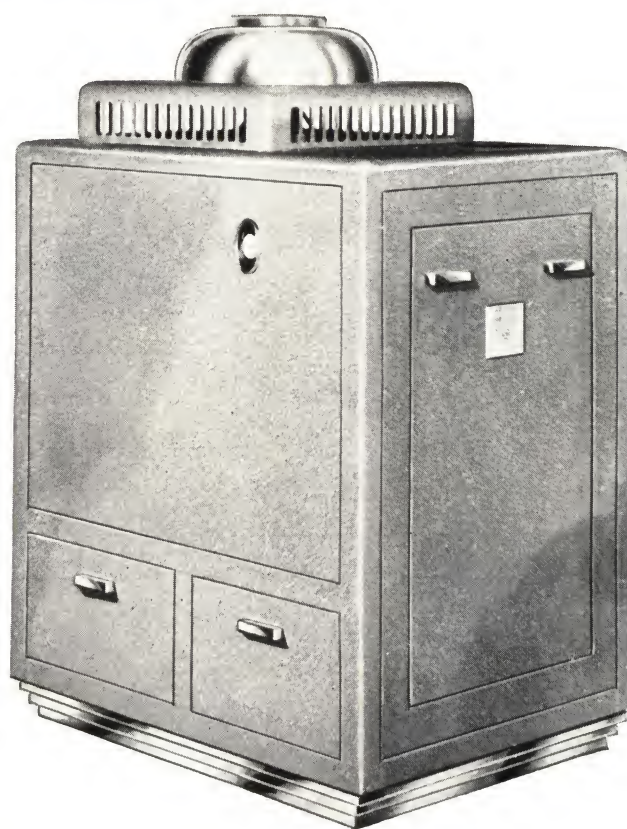
### THE COVER

The chassis and controls are completely insulated and enclosed by a cover of exceptional beauty. An industrial designer of nation-wide renown, worked in close collaboration with the National Engineers and designed the exterior with particular emphasis upon utility and durability, as well as upon appearance. The body is finished in French gray baked enamel, and harmonizes well with any surroundings and any color scheme. Fabricated by a manufacturer of fine metal furniture, it rests upon a base, built up of castings and angles, which has a hard chromium finish that resists the chemical action of floor cleaning materials, is not marred by shoe or brush, is quickly brightened by a damp cloth. The dome is likewise of heavy chromium plate, inside and out, its curve in symmetry with the lines of the body. The assembly is a harmonious whole . . . simple, modern, in excellent taste.

### THE CHASSIS—BY NATIONAL RESEARCH LABORATORIES

The engineering and mechanical principles are simple.

Ease of erection and of installation were given a prominent place in the planning. The number of parts to assemble

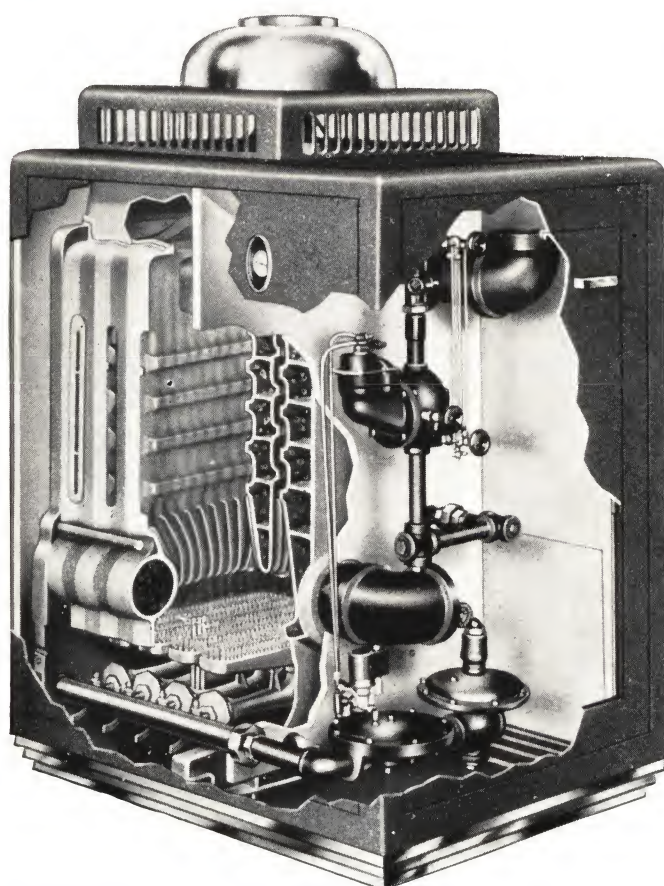


has been kept to a minimum. Piping connections are easily made.

Deep, internal tube sections expose maximum heating surface to the flame, provide large steam-liberating area and steam storage space. For hot water heating or storage work, this element is equally effective.

### SUPERIOR FEATURES OF DESIGN AND CONSTRUCTION

- (1) Cast iron flue top—sturdy; gas-tight joint.
- (2) Cast iron sections—rugged. Tested to 150 lbs. A.S.M.E. standard.
- (3) Internal baffles—assure rapid steaming and steady water line.
- (4) Intermediate sections—identical—interchangeable. Tapered flue passages give maximum efficiency.
- (5) Manifold and burner cocks—entirely enclosed.
- (6) Burner door—tight fitting, insulated.
- (7) Chromium plated dome—corrosion-proof—instantly cleaned—always bright.
- (8) Draft stabilizer—automatically maintains proper draft.
- (9) Gauge panel—framed with chromium border.
- (10) Controls—approved construction—completely enclosed.
- (11) Air cell insulation—heavy asbestos, shields top and sides from heat loss.
- (12) Chromium door handles—bright, decorative.
- (13) Chromium base—corrosion-proof, scar-proof, dust-proof—unmarred by floor cleaning materials.



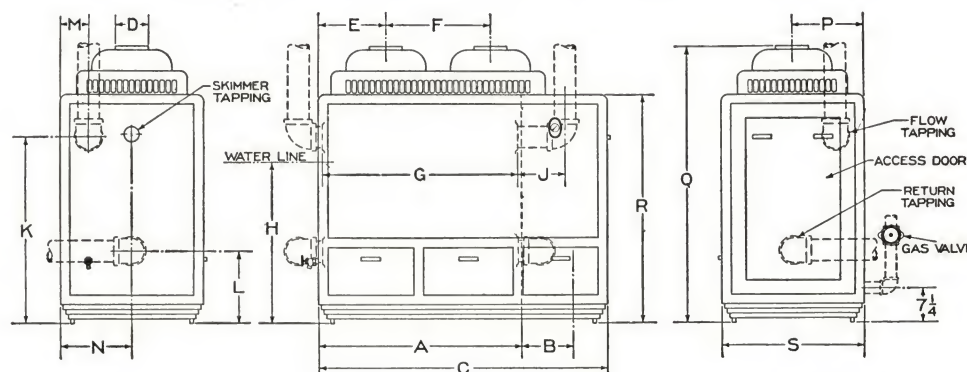


## NATIONAL GAS BOILERS (Continued)

## RATINGS AND DIMENSIONS

Boiler Series	Water line H	Number and Size of tappings			Flow tapping to c. l. of flow piping J	Floor to c. l. of flow tappings K	Floor to c. l. of return tappings L	Rear to c. l. of flow tappings M	Rear to c. l. of return tappings N	Rear to c. l. of flue outlet P	Floor to top of flue outlet Q	Floor to top of boiler cover R	Depth of Boiler cover S
		*Flow	*Return	Skimmer									
3	31"	2-3"	2-3"	1-1 1/4"	12 1/2"	34 1/4"	15"	5 1/4"	12 1/2"	12 1/2"	51 3/4"	41 1/2"	25"
4	34"	2-4"	2-4"	1-2"	10"	39 1/4"	15 1/4"	6"	15"	15"	58 3/8"	48 1/8"	30"

\*Five-section Series 3 and seven-section Series 4, and smaller, steam (Type "S") boilers have the left end Flow and Return Tappings plugged at factory—use right endappings. Do not bush flow tappings.



Boiler No.	STEAM Certified A.G.A. rating, sq. ft.	Water Certified A.G.A. rating, sq. ft.	Overall width C	Number and size of flue openings	To left flue opening E	Width between flue openings	Width face to face of tappings G
SERIES 3 BOILERS							
3-3	300	480	32 3/4"	1-6"	12 5/8"	...	13"
4-3	450	720	36 3/4"	1-6"	12 5/8"	...	17"
5-3	600	960	40 3/4"	1-7"	15 3/8"	...	21"
6-3	750	1200	44 3/4"	1-8"	15 3/8"	...	25"
7-3	900	1440	48 3/4"	1-9"	15 3/8"	...	29"
8-3	1050	1680	52 3/4"	1-9"	17 3/8"	...	33"
9-3	1200	1920	56 3/4"	1-9"	19 3/8"	...	37"
SERIES 4 BOILERS							
4-4	560	900	36 3/4"	1-7"	12 5/8"	...	17"
5-4	750	1200	40 3/4"	1-7"	15 3/8"	...	21"
6-4	940	1500	44 3/4"	1-8"	15 3/8"	...	25"
7-4	1130	1800	48 3/4"	1-8"	15 3/8"	...	29"
8-4	1310	2100	52 3/4"	1-9"	17 3/8"	...	33"
9-4	1500	2400	56 3/4"	2-7"	14 1/8"	18"	37"
10-4	1690	2700	60 3/4"	2-7"	14 1/8"	22"	41"
11-4	1880	3000	64 3/4"	2-8"	14 3/8"	18"	45"
12-4	2060	3300	68 3/4"	2-8"	14 3/8"	22"	49"
13-4	2250	3600	72 3/4"	2-8"	14 3/8"	26"	53"

## Trimings Furnished

## Type "S" Boilers—

McDonnell & Miller combination pressure control and low water cut-off.  
Robertshaw diaphragm cut-off valve.  
Minneapolis solenoid (magnetic) valve with transformer.  
Gas pressure regulator.  
Pop safety valve (set at 10 lbs.).  
Thermostatic pilot and escapement burners.  
Labeled shut-off valve.  
Compound retard vacuum and pressure gauge with siphon.  
Water level gauge glass and fittings.  
Metal jacketed cover.  
Chromium plated metal base for cover.  
Chromium plated draft dome.  
Drain cocks.  
Throttling control.

## Type "W" Boilers—

Robertshaw reverse acting thermostat.  
Robertshaw diaphragm cut-off valve.  
Minneapolis solenoid (magnetic) valve with transformer.  
Gas pressure regulator.  
Thermostatic pilot and escapement burners.  
Labeled shut-off valve.  
Altitude gauge and thermometer.  
Metal jacketed cover.  
Chromium plated base for cover.  
Chromium plated draft dome.  
Drain cocks.  
Throttling control (furnished on special order only).

## SPECIFICATIONS FOR NATIONAL GAS BOILERS

**Steam or Vapor**—Furnish and install according to manufacturer's instructions where shown on plans. No. .... National Gas Boiler, with a Certified A.G.A. Steam Rating of ..... sq. ft., as manufactured by the National Radiator Corporation, Johnstown, Pa. Boiler to be equipped with combination steam pressure control and low water cut-off, diaphragm cut-off valve, solenoid valve, gas pressure regulator, throttling control, pop safety valve, thermostatic pilot and escapement burners, labeled shut-off valve, compound retard pressure and vacuum gauge with siphon, water level gauge glass and fittings and drain cocks.

**Hot Water**—Furnish and install according to manufacturer's instructions where shown on plans. No. .... National Gas Boiler, with a Certified A.G.A. Water Rating of ..... sq. ft., as manufactured by the National Radiator Corporation, Johnstown, Pa. Boiler to be equipped with Robertshaw reverse acting thermostat, diaphragm cut-off valve, solenoid valve, gas pressure regulator, thermostatic pilot and escapement burners, labeled shut-off valve, altitude gauge and thermometer and drain cocks.

**General (for Steam, Vapor and Hot Water)**—Furnish and install according to manufacturer's instructions the National Metal Jacketed Cover. Cover to be complete with chromium plated metal base for supporting the metal cover, chromium

plated draft dome, control cabinet for housing all controls, burner and control access doors and heavy asbestos air cell insulation attached to the metal cover parts.

Furnish and install proper sized water connections with valve close to boiler.

Furnish and install ..... in. gas line from meter to the labeled shut-off valve, which shall be located in the gas line close to the boiler.

Connect vent opening to outside of building using 1/4-in. galvanized pipe with union placed at the regulator end. The vent line to terminate outside of the building structure at least 3 ft. above the ground and to have an elbow faced down on the end of the line.

Furnish and install flue pipe from draft dome (or domes) on boiler to the chimney. Flue pipe to be made from ..... gauge (specify desired corrosion resisting metal) metal and to be of ..... in. in diameter (size shown in following table). Flue pipe to pitch upward from the boiler.

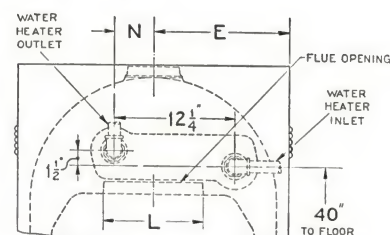
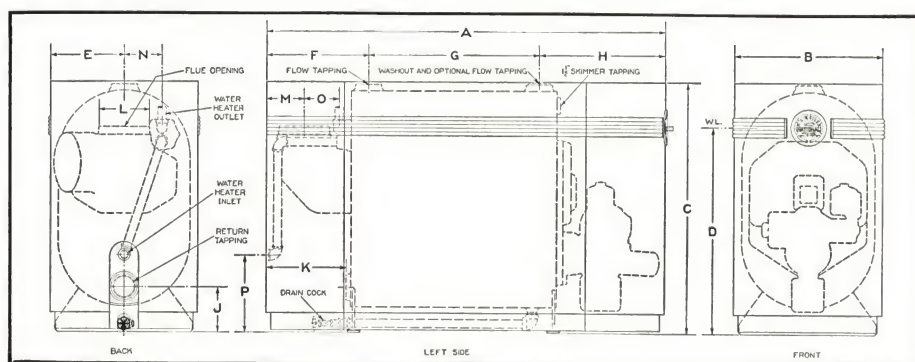
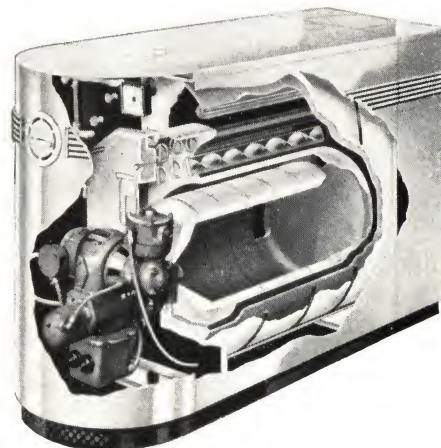
That this boiler has been manufactured and tested in accordance with the code of the American Society of Mechanical Engineers, that it is guaranteed against manufacturing defects for a period of one year from date of purchase, and that it will deliver its rated capacity, shall be set forth in a Surety Bond of a bonding company approved by the Architect.



## NATIONAL STEEL OIL HEATING UNITS



The National Steel Oil Heating Unit is comprised of a Scotch Marine, fire-tube type welded boiler and a low pressure atomizing type burner. The boilers are equipped with refractory combustion chamber, turbulators, a National Observation Port and complete equipment for automatic firing. Each boiler is fitted with a Taco Biltin domestic hot water heater. The Nos. 2 and 3 units are shipped completely assembled on skids. The Nos. 4 and 5 units are shipped completely assembled with the exception of the burner and front cabinet of the jacket.



Above diagram shows water heater used on Nos. 4 and 5 units. Water heater used on Nos. 2 and 3 units shown in drawing at left.

## DIMENSIONS

Type of Boiler	Boiler No.	Length of boiler	Width of boiler	Height of boiler	Height of water line	Side to c.l. of flow tapping	Rear to c.l. of flow tapping	Distance between flow tappings	Front to c.l. of optional flow tapping	Floor to c.l. of return tapping	Rear to face of return tapping	Diam. of flue opening	Rear to c.l. of flue opening	Water heater outlet to c.l. of boiler	Water heater outlet to c.l. of flue opening	Floor to c.l. water heater inlet	Size of storage water heater connections	Size of flow and return tappings	Pop safety valve size
		A	B	C	D	E	F	G	H	J	K	L	M	N	O	P			
Steam	S-2	53 1/2"	23"	38 7/8"	32"	11 1/2"	15 7/8"	17 3/4"	19 1/2"	7"	12 3/8"	8"	5 5/8"	5 7/8"	5 3/8"	12 1/2"	1"	3"	3/4"
	S-3	61 7/8"	23"	38 7/8"	32"	11 1/2"	15 7/8"	26 1/2"	19 1/2"	7"	12 3/8"	8"	5 5/8"	5 7/8"	5 3/8"	12 1/2"	1"	3"	1"
	S-4	63 7/8"	27 1/2"	50 1/4"	42"	13 3/4"	18 5/8"	22"	23 1/4"	7 5/8"	14 3/8"	10"	6 3/4"	4"	6"	40"	1"	4"	1 1/4"
	S-5	74 1/8"	27 1/2"	50 1/4"	42"	13 3/4"	18 5/8"	32 1/4"	23 1/4"	7 5/8"	14 3/8"	10"	6 3/4"	4"	6"	40"	1"	4"	1 1/2"
Water	W-2	53 1/2"	23"	38 7/8"	...	11 1/2"	15 7/8"	17 3/4"	19 1/2"	7"	12 3/8"	8"	5 5/8"	5 7/8"	5 3/8"	12 1/2"	1"	3"	...
	W-3	61 7/8"	23"	38 7/8"	...	11 1/2"	15 7/8"	26 1/2"	19 1/2"	7"	12 3/8"	8"	5 5/8"	5 7/8"	5 3/8"	12 1/2"	1"	3"	...
	W-4	63 7/8"	27 1/2"	50 1/4"	...	13 3/4"	18 5/8"	22"	23 1/4"	7 5/8"	14 3/8"	10"	6 3/4"	4"	6"	40"	1"	4"	...
	W-5	74 1/8"	27 1/2"	50 1/4"	...	13 3/4"	18 5/8"	32 1/4"	23 1/4"	7 5/8"	14 3/8"	10"	6 3/4"	4"	6"	40"	1"	4"	...

## RATINGS AND FUEL CAPACITIES

Boiler	Net load ratings, sq. ft.	Available output		Recommended input		Heating surface, sq. ft.	Recommended chimney size	
		Sq. ft.	B. t. u.	Lbs. oil per hr.	Gal oil per hr.		Size, in.	Height, ft.
S-2	320	430	103,700	7.2	1.0	18.8	8 x 8	25
S-3	450	610	145,800	10.1	1.4	26.5	8 x 8	30
S-4	650	880	210,600	14.6	2.0	38.3	8 x 12	35
S-5	900	1215	291,600	20.3	2.7	53.0	8 x 12	40
W-2	510	690	103,700	7.2	1.0	18.8	8 x 8	25
W-3	720	970	145,800	10.1	1.4	26.5	8 x 8	30
W-4	1040	1400	210,600	14.6	2.0	38.3	8 x 12	35
W-5	1440	1950	291,600	20.3	2.7	53.0	8 x 12	40

## HOT WATER HEATER CAPACITIES

Boiler No.	Rated capacities gallons per 3 hours	Recommended storage tank size, capacity—gallons	Size pipe to storage tank
2	50	Up to 50	1"
3	50	Up to 50	1"
* 4	75	Up to 82	1"
* 5	75	Up to 82	1"

\*Larger size storage type heater with capacity of 110 gallons per three hours, and a tankless type heater with capacity of 180 gallons per hour are also available. All capacities based on boiler water at 180° F.

## STANDARD EQUIPMENT

**Steam and Water Boilers**—Burner, boiler, cast iron plate-work, relief by-pass, refractory combustion chamber, turbulators, enameled sheet metal jacket, air cell insulation, National observation port, 3/4-in. nickel plated drain cock, draft regulator, stack safety control, water temperature control, Biltin Taco submerged hot water heater and room

thermostat.

**Steam Boilers Only**—Water gauge fittings, pop safety valve, steam pressure gauge, steam pressure control and built-in McDonnell & Miller low water cut-off.

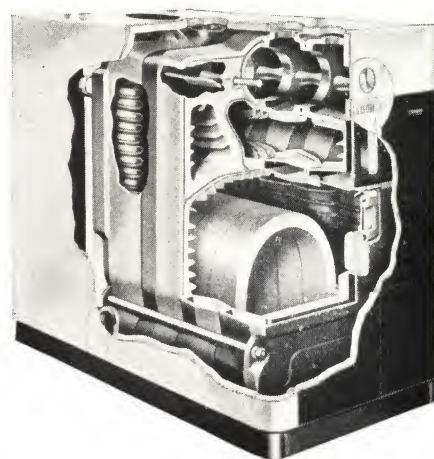
**Water Boilers Only**—Altitude-pressure gauge and thermometer.



## NATIONAL CAST IRON OIL HEATING UNITS



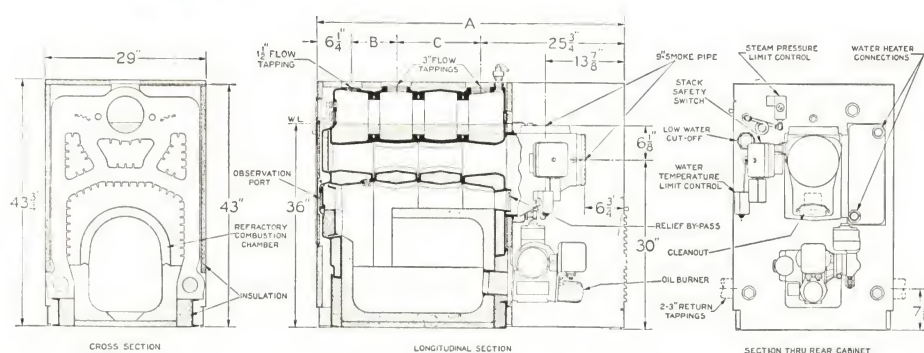
National Cast Iron Oil Heating Units are regularly equipped with a high pressure atomizing oil burner but a low pressure type burner is available at extra cost. Boilers are fitted with a refractory combustion chamber. Taco Biltin storage type hot water heater and all controls required for automatic heating. (See complete list of equipment at bottom of page.) Extended heating surface in the form of fingers is provided along the waterlegs and flue galleries. Large nipple ports provide unrestricted circulation, while special baffles in the sections and a large steam releasing area provide dry steam. Water line is only 36 in. high.



### RECOMMENDED FIRING RATES

Boiler No. 6—gallons per hr., 1.4  
Boiler No. 8—gallons per hr., 1.9  
Boiler No. 10—gallons per hr., 2.4

It is recommended that boilers be operated with input rates shown in the table. Boilers so operated should give the most satisfactory results.



Boiler No.		Dimensions			Number and size of flow tappings	Number and size of return tappings	*Domestic Hot Water Heater		
Steam	Water	A	B	C			Rated capacities gallons per 3 hours 40° to 140 F.	Recommended storage tank size capacity, gallons	Pipe size to storage tank
S- 6	W- 6	47 1/4"	21 1/2"	15 1/4"	1-1 1/2" and 1-3"	2-3"	44	Up to 66	1"
S- 8	W- 8	55 5/16"	14 5/16"	15 1/4"	1-1 1/2" and 2-3"	2-3"	44	Up to 66	1"
S-10	W-10	63 3/8"	14 3/8"	23 1/4"	1-1 1/2" and 2-3"	2-3"	44	Up to 66	1"

\*A larger storage type heater with capacity of 100 gallons per three hours and two sizes of tankless heaters (180 and 210 gallons per hour) are also available. All capacities based on boiler water at 180° F.

### RATINGS AND FUEL CAPACITIES

Boiler No.		Heating surface, sq. ft.	Bonded Load Rating		Minimum Recommended Oil Input, per hour			Chimney size	
Steam	Water		Steam, sq. ft.	Water, sq. ft.	B.t.u.	Pounds	Gallons	Size, in.	Height, in.
S- 6	W- 6	32.1	410	655	192,500	10.0	1.36	8x 8	30
S- 8	W- 8	43.8	565	905	263,000	13.7	1.87	8x12	35
S-10	W-10	55.6	720	1150	333,700	17.4	2.36	8x12	35

(1) Bonded Load Ratings represent actual installed cast iron radiation plus domestic hot water load. To express the water heater load in terms of square feet of radiation, figure each gallon of storage tank capacity as equivalent to 1 sq. ft. of steam radiation or 1.6 sq. ft. of hot water radiation. When built-in tankless heater is installed, add 50 sq. ft. steam radiation or 80 sq. ft. water radiation per bathroom to

installed radiation before selecting boiler size.

Ample allowance for piping and pick-up is made in the Bonded Load Ratings for the average installation. If the piping load is excessive, additional allowance should be made.

(2) Minimum Burner Capacity is based on oil of 19,200 B.t.u. per lb. and 7.35 lbs. per gallon.

### STANDARD EQUIPMENT

**Steam and Water Boilers**—Boiler, burner, cast iron plate-work, relief by-pass, refractory combustion chamber, enameled sheet metal jacket, heavy air-cell insulation, special moulded insulation for combustion chamber, National observation port, 3/4-in. nickel plated drain cock, Taco Biltin submerged water heater, draft regulator, stack safety con-

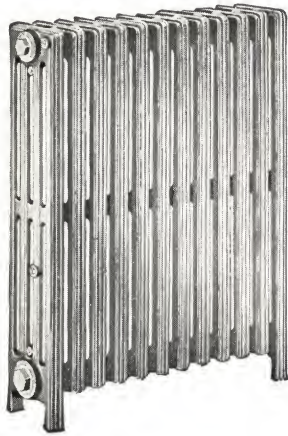
trol, water temperature control and room thermostat.

**Steam Boilers Only**—Water gauge fittings, pop safety valve, steam pressure gauge, built-in McDonnell & Miller low water cut-off and steam pressure control.

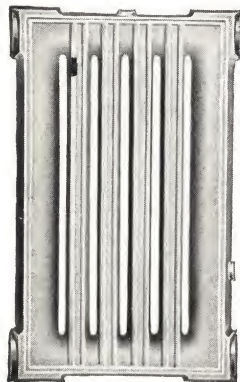
**Water Boilers Only**—Altitude-pressure gauge and thermometer.



## NATIONAL ART AND AERO RADIATORS



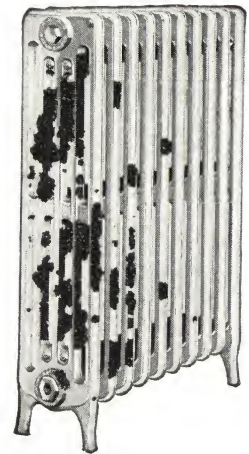
Art Radiator



Aero Wall

NATIONAL RADIATOR CORPORATION has played a leading part in the development of radiator heating. The Aero was the first tube type radiator placed on the market to replace the old style column radiation. National was the leader in successfully utilizing push nipple construction; was the first manufacturer to introduce an all-cast-iron convector and, more recently, was the first to produce a truly artistic small tube radiator—the National Art.

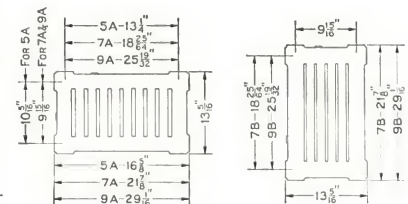
Art radiators are especially adaptable for modernization work as they can be used either exposed or recessed, and will replace the older and larger styles with only minor piping changes. Due to its low steam or water content, the Art radiator heats very quickly, making it well adapted for the "on" and "off" demands of automatically fired systems.



Aero Tube

### AERO WALL RADIATORS

Number of sections	Length of space occupied				Heating surface, sq. ft.	
	Type 5-A ft. in.	Type 7-A ft. in.	Type 9-A ft. in.	Types 7-B, 9-B ft. in.	Type 7	Type 9
1	1- 4 <sup>5</sup> / <sub>8</sub>	1- 9 <sup>7</sup> / <sub>8</sub>	2- 5 <sup>1</sup> / <sub>16</sub>	1- 1 <sup>5</sup> / <sub>16</sub>	7	9
2	2- 9 <sup>1</sup> / <sub>4</sub>	3- 7 <sup>3</sup> / <sub>4</sub>	4- 10 <sup>1</sup> / <sub>8</sub>	2- 2 <sup>5</sup> / <sub>8</sub>	14	18
3	4- 1 <sup>7</sup> / <sub>8</sub>	5- 5 <sup>5</sup> / <sub>8</sub>	7- 3 <sup>3</sup> / <sub>16</sub>	3- 3 <sup>15</sup> / <sub>16</sub>	21	27
4	5- 6 <sup>1</sup> / <sub>2</sub>	7- 3 <sup>1</sup> / <sub>2</sub>	9- 8 <sup>1</sup> / <sub>4</sub>	4- 5 <sup>1</sup> / <sub>4</sub>	28	36
5	6- 11 <sup>1</sup> / <sub>8</sub>	9- 1 <sup>3</sup> / <sub>8</sub>	12- 1 <sup>3</sup> / <sub>8</sub>	5- 6 <sup>9</sup> / <sub>16</sub>	35	45
6	8- 3 <sup>3</sup> / <sub>4</sub>	10- 11 <sup>1</sup> / <sub>4</sub>	14- 6 <sup>3</sup> / <sub>8</sub>	6- 7 <sup>7</sup> / <sub>8</sub>	42	54
7	9- 8 <sup>3</sup> / <sub>8</sub>	12- 9 <sup>1</sup> / <sub>8</sub>	16- 11 <sup>7</sup> / <sub>16</sub>	7- 9 <sup>3</sup> / <sub>16</sub>	49	63
8	11- 1	14- 7	19- 4 <sup>1</sup> / <sub>2</sub>	8- 10 <sup>1</sup> / <sub>2</sub>	56	72
9	12- 5 <sup>5</sup> / <sub>8</sub>	16- 4 <sup>7</sup> / <sub>8</sub>	21- 9 <sup>9</sup> / <sub>16</sub>	9- 11 <sup>13</sup> / <sub>16</sub>	63	81
10	13- 10 <sup>1</sup> / <sub>4</sub>	18- 2 <sup>3</sup> / <sub>4</sub>	24- 2 <sup>5</sup> / <sub>8</sub>	11- 1 <sup>1</sup> / <sub>8</sub>	70	90
11	15- 2 <sup>7</sup> / <sub>8</sub>	20- 0 <sup>5</sup> / <sub>8</sub>	26- 7 <sup>1</sup> / <sub>16</sub>	12- 2 <sup>7</sup> / <sub>16</sub>	77	99
12	16- 7 <sup>1</sup> / <sub>2</sub>	21- 10 <sup>1</sup> / <sub>2</sub>	29- 0 <sup>3</sup> / <sub>4</sub>	13- 3 <sup>3</sup> / <sub>4</sub>	84	108



### ART RADIATORS—SIZES AND RATINGS

Number of sections	Length 1 <sup>1</sup> / <sub>2</sub> in. per section	THREE-TUBE			FOUR-TUBE			FIVE-TUBE		
		19 in. Height 1.1 sq. ft. per section	22 in. Height 1.3 sq. ft. per section	25 in. Height 1.5 sq. ft. per section	19 in. Height 1.4 sq. ft. per section	22 in. Height 1.6 sq. ft. per section	25 in. Height 1.8 sq. ft. per section	20 in. Height 1.8 sq. ft. per section	23 in. Height 2.1 sq. ft. per section	26 in. Height 2.4 sq. ft. per section
2	3	2.2	2.6	3.0	2.8	3.2	3.6	3.6	4.2	4.8
4	6	4.4	5.2	6.0	5.6	6.4	7.2	7.2	8.4	9.6
6	9	6.6	7.8	9.0	8.4	9.6	10.8	10.8	12.6	14.4
8	12	8.8	10.4	12.0	11.2	12.8	14.4	14.4	16.8	19.2
10	15	11.0	13.0	15.0	14.0	16.0	18.0	18.0	21.0	24.0
12	18	13.2	15.6	18.0	16.8	19.2	21.6	21.6	25.2	28.8
14	21	15.4	18.2	21.0	19.6	22.4	25.2	25.2	29.4	33.6
16	24	17.6	20.8	24.0	22.4	25.6	28.8	28.8	33.6	38.4
18	27	19.8	23.4	27.0	25.2	28.8	32.4	32.4	37.8	43.2
20	30	22.0	26.0	30.0	28.0	32.0	36.0	36.0	42.0	48.0
22	33	24.2	28.6	33.0	30.8	35.2	39.6	39.6	46.2	52.8
24	36	26.4	31.2	36.0	33.6	38.4	43.2	43.2	50.4	57.6
26	39	28.6	33.8	39.0	36.4	41.6	46.8	46.8	54.6	62.4
28	42	30.8	36.4	42.0	39.2	44.8	50.4	50.4	58.8	67.2
30	45	33.0	39.0	45.0	42.0	48.0	54.0	54.0	63.0	72.0
32	48	35.2	41.6	48.0	44.8	51.2	57.6	57.6	67.2	76.8
34	51	37.4	44.2	51.0	47.6	54.4	61.2	61.2	71.4	81.6
36	54	39.6	46.8	54.0	50.4	57.6	64.8	64.8	75.6	86.4
38	57	41.8	49.4	57.0	53.2	60.8	68.4	68.4	79.8	91.2
40	60	44.0	52.0	60.0	56.0	64.0	72.0	72.0	84.0	96.0
42	63	46.2	54.6	63.0	58.8	67.2	75.6	75.6	88.2	100.8
44	66	48.4	57.2	66.0	61.6	70.4	79.2	79.2	92.4	105.6
46	69	50.6	59.8	69.0	64.4	73.6	82.8	82.8	96.6	110.4
48	72	52.8	62.4	72.0	67.2	76.8	86.4	86.4	100.8	115.2
50	75	55.0	65.0	75.0	70.0	80.0	90.0	90.0	105.0	120.0
Sq. ft. per lineal inch		0.733	0.867	1.000	0.933	1.067	1.200	1.200	1.400	1.600
Distance from floor to center of top tapping		17 <sup>7</sup> / <sub>8</sub>	20 <sup>7</sup> / <sub>8</sub>	23 <sup>7</sup> / <sub>8</sub>	17 <sup>7</sup> / <sub>8</sub>	20 <sup>7</sup> / <sub>8</sub>	23 <sup>7</sup> / <sub>8</sub>	18 <sup>7</sup> / <sub>8</sub>	21 <sup>7</sup> / <sub>8</sub>	24 <sup>7</sup> / <sub>8</sub>
Distance from floor to center bottom tapping		2 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>2</sub>	3 <sup>1</sup> / <sub>2</sub>	3 <sup>1</sup> / <sub>2</sub>	3 <sup>1</sup> / <sub>2</sub>

Depth of sections: three-tube, 3<sup>3</sup>/<sub>8</sub> in.; four-tube, 4<sup>1</sup>/<sub>8</sub> in.; five-tube, 5<sup>3</sup>/<sub>4</sub> in.

Depth at feet is the same as depth of section.

Add 1/2 in. to length for each bushing.

Tapped 1 1/4 in. at bottom both ends; 1 in. top both ends.

Can be furnished legless or with legs 4 1/2 in. from floor to center of bottom tapping when ordered.

To determine over-all height of three-tube or four-tube legless radiators, deduct 1 3/8 in. from the standard heights. For five-tube deduct 2 3/8 in.



## NATIONAL AERO RADIATORS

## SIZES AND RATINGS

Number of sections	*Length 2 1/2 in. per sec.	Three-Tube					Four-Tube					Five-Tube				
		36-in. Height 3 1/2 sq. ft. per sec.	30-in. Height 3 sq. ft. per sec.	26-in. Height 2 1/4 sq. ft. per sec.	23-in. Height 2 sq. ft. per sec.	20-in. Height 1 3/4 sq. ft. per sec.	36-in. Height 4 1/4 sq. ft. per sec.	30-in. Height 3 1/2 sq. ft. per sec.	26-in. Height 2 3/4 sq. ft. per sec.	23-in. Height 2 1/2 sq. ft. per sec.	20-in. Height 2 1/4 sq. ft. per sec.	36-in. Height 5 sq. ft. per sec.	30-in. Height 4 1/4 sq. ft. per sec.	26-in. Height 3 1/2 sq. ft. per sec.	23-in. Height 3 sq. ft. per sec.	20-in. Height 2 3/4 sq. ft. per sec.
2	5	7	6	4 3/8	4	3 1/2	8 1/2	7	5 1/2	5	4 1/2	10	8 3/8	7	6	5 1/8
3	7 1/2	10 1/2	9	7	6	5 1/4	12 3/4	10 1/2	8 1/4	7 1/2	6 3/4	15	13	10 1/2	9	8
4	10	14	12	9 1/8	8	7	17	14	11	10	9	20	17 1/8	14	12	10 3/8
5	12 1/2	17 1/2	15	11 3/8	10	8 3/4	21 1/4	17 1/2	13 3/4	12 1/2	11 1/4	25	21 3/8	17 1/2	15	13 3/8
6	15	21	18	14	12	10 1/2	25 1/2	21	16 1/2	15	13 1/2	30	26	21	18	16
7	17 1/2	24 1/2	21	16 1/8	14	12 1/4	29 3/4	24 1/2	19 1/4	17 1/2	15 3/4	35	30 1/8	24 1/2	21	18 3/8
8	20	28	24	18 3/8	16	14	34	28	22	20	18	40	34 3/8	28	24	21 1/8
9	22 1/2	31 1/2	27	21	18	15 3/4	38 1/4	31 1/2	24 3/4	22 1/2	20 1/4	45	39	31 1/2	27	24
10	25	35	30	23 1/8	20	17 1/2	42 1/2	35	27 1/2	25	22 1/2	50	43 1/8	35	30	26 3/8
11	27 1/2	38 1/2	33	25 3/8	22	19 1/4	46 3/4	38 1/2	30 1/4	27 1/2	24 3/4	55	47 3/8	38 1/2	33	29 1/8
12	30	42	36	28	24	21	51	42	33	30	27	60	52	42	36	32
13	32 1/2	45 1/2	39	30 1/8	26	22 3/4	55 1/4	45 1/2	35 3/4	32 1/2	29 1/4	65	56 1/8	45 1/2	39	34 3/8
14	35	49	42	32 3/8	28	24 1/2	59 1/2	49	38 1/2	35	31 1/2	70	60 3/8	49	42	37 1/8
15	37 1/2	52 1/2	45	35	30	26 1/4	63 3/4	52 1/2	41 1/4	37 1/2	33 3/4	75	65	52 1/2	45	40
16	40	56	48	37 1/8	32	28	68	56	44	40	36	80	69 1/8	56	48	42 3/8
17	42 1/2	59 1/2	51	39 3/8	34	29 3/4	72 1/4	59 1/2	46 3/4	42 1/2	38 1/4	85	73 3/8	59 1/2	51	45 1/8
18	45	63	54	42	36	31 1/2	76 1/2	63	49 1/2	45	40 1/2	90	78	63	54	48
19	47 1/2	66 1/2	57	44 1/8	38	33 1/4	80 3/4	66 1/2	52 1/4	47 1/2	42 3/4	95	82 1/8	66 1/2	57	50 3/8
20	50	70	60	46 3/8	40	35	85	70	55	50	45	100	86 3/8	70	60	53 1/8
21	52 1/2	73 1/2	63	49	42	36 3/4	89 1/4	73 1/2	57 3/4	52 1/2	47 1/4	105	91	73 1/2	63	56
22	55	77	66	51 1/8	44	38 1/2	93 1/2	77	60 1/2	55	49 1/2	110	95 1/8	77	66	58 3/8
23	57 1/2	80 1/2	69	53 3/8	46	40 1/4	97 3/4	80 1/2	63 1/4	57 1/2	51 3/4	115	99 3/8	80 1/2	69	61 1/8
24	60	84	72	56	48	42	102	84	66	60	54	120	104	84	72	64
25	62 1/2	87 1/2	75	58 1/8	50	43 3/4	106 1/4	87 1/2	68 3/4	62 1/2	56 1/4	125	108 1/8	87 1/2	75	66 3/8
Distance from floor to center of top tapping		33 13/16	27 7/8	23 13/16	20 13/16	17 7/8	33 13/16	27 7/8	23 13/16	20 13/16	17 7/8	33 13/16	27 7/8	23 13/16	20 13/16	17 7/8
Distance from floor to center bottom tapping		4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2

Number of sections	*Length 2 1/2 in. per sec.	Six-Tube					Seven-Tube					
		38-in. Height 6 sq. ft. per sec.	32-in. Height 5 sq. ft. per sec.	26-in. Height 4 sq. ft. per sec.	23-in. Height 3 1/2 sq. ft. per sec.	20-in. Height 3 sq. ft. per sec.	36-in. Height 6 3/4 sq. ft. per sec.	30-in. Height 5 1/2 sq. ft. per sec.	26-in. Height 4 3/4 sq. ft. per sec.	20-in. Height 3 3/8 sq. ft. per sec.	16 1/2-in. Height 3 sq. ft. per sec.	13 1/2-in. Height 2 1/2 sq. ft. per sec.
2	5	12	10	8	7	6	13 1/2	11	9 1/2	7 1/8	6	5
3	7 1/2	18	15	12	10 1/2	9	20 1/4	16 1/2	14 1/4	11	9	7 1/2
4	10	24	20	16	14	12	27	22	19	14 3/8	12	10
5	12 1/2	30	25	20	17 1/2	15	33 3/4	27 1/2	23 3/4	18 1/8	15	12 1/2
6	15	36	30	24	21	18	40 1/2	33	28 1/2	22	18	15
7	17 1/2	42	35	28	24 1/2	21	47 1/4	38 1/2	33 1/4	25 3/8	21	17 1/2
8	20	48	40	32	28	24	54	44	38	29 1/8	24	20
9	22 1/2	54	45	36	31 1/2	27	60 3/4	49 1/2	42 3/4	33	27	22 1/2
10	25	60	50	40	35	30	67 1/2	55	47 1/2	36 3/8	30	25
11	27 1/2	66	55	44	38 1/2	33	74 1/4	60 1/2	52 1/4	40 3/8	33	27 1/2
12	30	72	60	48	42	36	81	66	57	44	36	30
13	32 1/2	78	65	52	45 1/2	39	87 3/4	71 1/2	61 3/4	47 3/8	39	32 1/2
14	35	84	70	56	49	42	94 1/2	77	66 1/2	51 1/8	42	35
15	37 1/2	90	75	60	52 1/2	45	101 1/4	82 1/2	71 1/4	55	45	37 1/2
16	40	96	80	64	56	48	108	88	76	58 3/8	48	40
17	42 1/2	102	85	68	59 1/2	51	114 3/4	93 1/2	80 3/4	62 1/8	51	42 1/2
18	45	108	90	72	63	54	121 1/2	99	85 1/2	66	54	45
19	47 1/2	114	95	76	66 1/2	57	128 1/4	104 1/2	90 1/4	69 3/8	57	47 1/2
20	50	120	100	80	70	60	135	110	95	73 1/8	60	50
21	52 1/2	126	105	84	73 1/2	63	141 3/4	115 1/2	99 3/4	77	63	52 1/2
22	55	132	110	88	77	66	148 1/2	121	104 1/2	80 3/8	66	55
23	57 1/2	138	115	92	80 1/2	69	155 1/4	126 1/2	109 1/4	84 3/8	69	57 1/2
24	60	144	120	96	84	72	162	132	114	88	72	60
25	62 1/2	150	125	100	87 1/2	75	168 3/4	137 1/2	118 3/4	91 3/8	75	62 1/2
Distance from floor to center of top tapping		35 7/8	29 15/16	23 15/16	20 11/16	17 7/8	33 13/16	27 7/8	23 13/16	17 7/8	14 3/8	11 3/8
Distance from floor to center bottom tapping		4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	3	3

	Width of Feet	Width of Section
3-Tube	5 1/8"	5 1/8"
4-Tube	6 13/16"	6 13/16"
5-Tube	7 1/16"	7 1/16"
6-Tube	9"	9"
7-Tube	12"	12"

Tapped 1 1/2 in. top one end and bottom both ends and bushed to sizes required.

Can be furnished legless, or with legs 6 in. from floor to center of tapping boss when ordered; also 4 1/2-in. legs for the 7-tube on the 13 1/2-in. and 16 1/2-in. heights.

To determine height of legless radiators deduct 2 1/4 in. from standard height of the 3-, 4-, 5- and 7-tube radiators, except the 13 1/2 and 16 1/2-in., in which case 3/4-in. should be deducted; deduct 2 1/2 in. from the standard height of the 6-tube radiators.

All radiators are assembled with high test cast iron push nipples top and bottom.

\*Add 1/2 in. to length for each bushing.



## THE AERO CONVECTOR

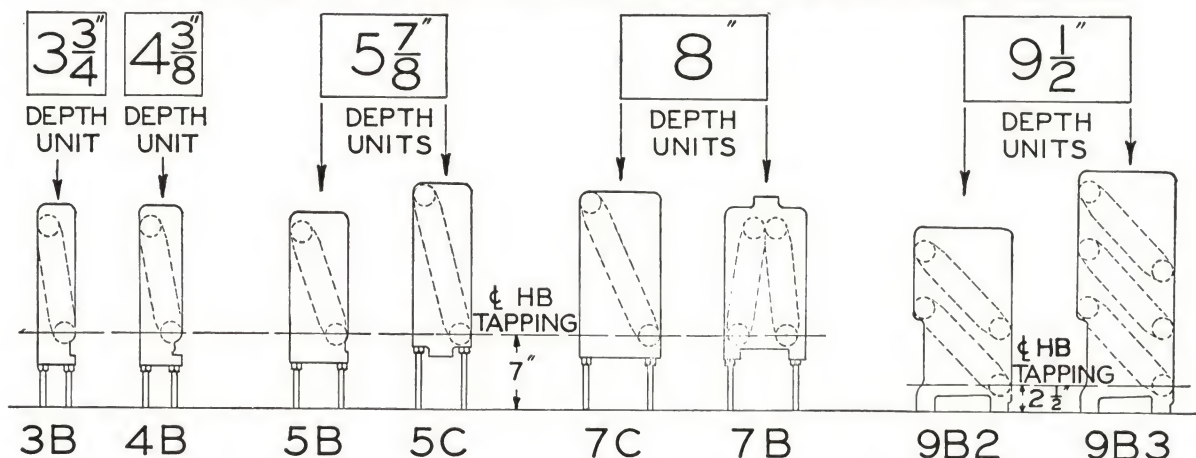
The Aero Convector is a durable cast iron sectional fin-cast-integral concealed heating unit especially designed to obtain comfort by delivering into a room a large volume of moderately warmed air. The ingenious method of sloping the intermediate sections permits the combining of wide fin spacing with short air travel which produces low ceiling temperatures, saves fuel and avoids stratification of air.

Aero Convertors are more conservatively rated than any

others and are tested in accordance with the A.S.H.V.E. Code. They are admirably suited for all types of heating systems because they possess all the desirable characteristics of the direct radiator. The ability to retain heat makes them ideal for automatic regulation and split air conditioning systems. Being ruggedly constructed they can withstand abuse and be used for temporary heat while building is under construction.

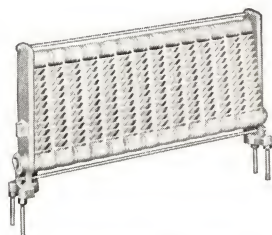
### RECESS DEPTHS—

These end views show the wide latitude in recess depths that can be met with Aero Convertors.



Leg heights are specified from floor to center line of "HB" tapping. Standard leg heights are 7 in. for all except 9B2 and 9B3, which are 2 1/2 in. Specify 6-in. legs for 5C, 7C, 7B or 9B2 with lowest enclosure height.

### TYPES OF CONVECTORS AVAILABLE

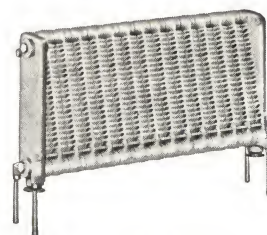


Convector No. 3B30  
for One-pipe Steam

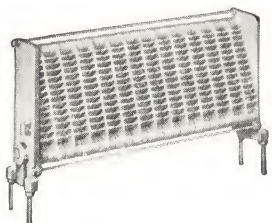
Units illustrated for One-pipe Steam Systems are also available with other end sections for water, vapor or vacuum systems. Units illustrated for Water, Vapor or Vacuum Systems are also available with other end sections for one-pipe steam systems. Only 5B and 7B units are available with vertical top tapings.

Extensive study of the problems involved in satisfactory operation of convectors on one-pipe steam jobs led to the development of special end sections shown in several illustrations herewith. Top tapings, which are not required, have been eliminated. One outstanding advantage of the new section lies in the fact that entering steam cannot spray water against the air valve, causing "spitting" and fouling.

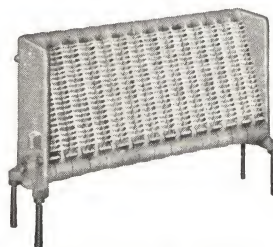
For complete information request Catalog No. 273-A.



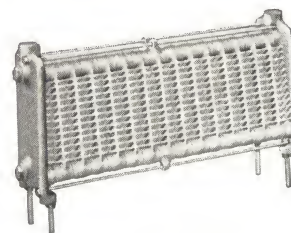
Convector No. 5C30  
for Water, Vapor or Vacuum



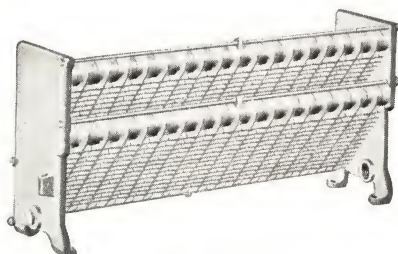
Convector No. 5B30  
for One-pipe Steam



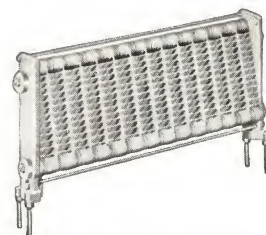
Convector No. 7C30  
for One-pipe Steam



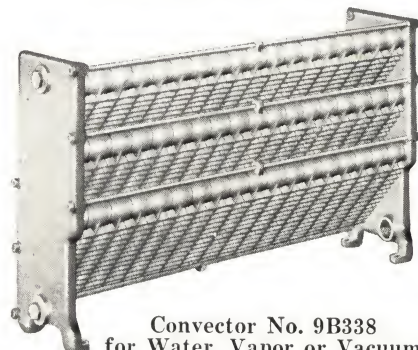
Convector No. 7B32  
for Water, Vapor or Vacuum



Convector No. 9B238  
for One-pipe Steam



Convector No. 4B30  
for Water, Vapor or Vacuum



Convector No. 9B338  
for Water, Vapor or Vacuum



# THE AERO CONVECTOR (Continued)

## AERO ENCLOSURES APPLIED TO CONSTRUCTION

**Type "RE"**—A complete enclosure which—as is shown in the illustrations above—can be used free standing, partially recessed, or completely recessed. It has a removable front. If recessed in the wall, plaster should finish against ends and top of enclosure. When recessed under wood stool, plaster should finish against ends of enclosure. Stool and apron should be extended over enclosure, and apron fitted between stool and enclosure top. Scribe moulding may be used at ends of enclosure.

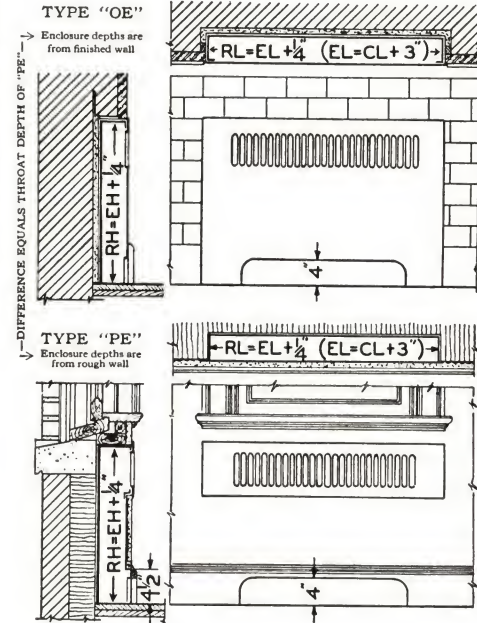
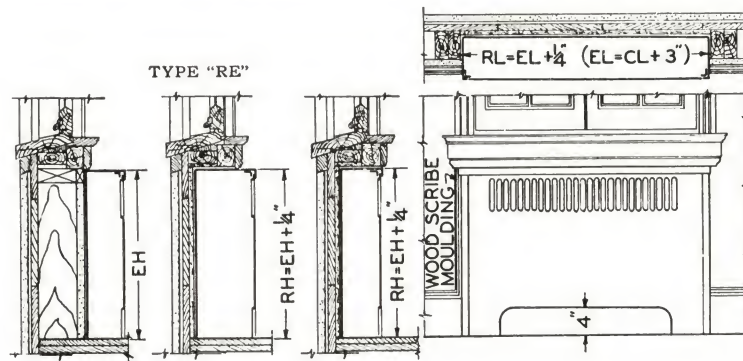
**Type "OE"**—Shown at right, is a complete enclosure for full recessing in walls or under windows. The front overlaps tile or plaster  $\frac{1}{2}$  in. at top and  $\frac{3}{4}$  in. at each end. It is attached to liner by screws or clips. If recess is not deep enough to accommodate enclosure, wall must be furred to suit, as enclosure front must fit against finished wall. Top and sides are beveled to insure air-tight joint with plaster.

**Type "PE"**—Shown at right, is a complete enclosure for use in plaster or tile treatments, and must be fully recessed. The front is provided with holes or clips for securing wire lath. The throat is arranged for a  $\frac{3}{4}$ -in. thickness of lath and plaster,

or a  $\frac{1}{2}$ -in. thickness of tile, and is flanged to receive outlet grille. Order must specify when enclosures are for tile installation. Bottom inlet is flanged to receive ground to which baseboard may be attached. Inlet opening in liner is  $4\frac{1}{2}$ -in. high, and a 4-in. high arched inlet must be provided in baseboard by carpenter. Four sides of outlet grille are beveled to insure airtight joint with plaster.

All enclosure dimensions are inside measurements. An allowance of  $\frac{1}{4}$  in. in length, height and depth is advisable between recess and these enclosure dimensions.

KEY	
CL—	Convactor Length
EL—	Enclosure Length
RL—	Recess Length
FPL—	Front Panel Length
EH—	Enclosure Height
RH—	Recess Height
FPH—	Front Panel Height
Bar type outlet grille and arched inlets are standard. Access to valve is through arched inlet.	



## AERO FRONT PANELS APPLIED

**Type "EF" Front Panels**—Shown top right provide additional depth. Side and top edges bear against, and extend from, face of plaster. Face of front is beyond baseboard and overlaps recess at top and sides. Front is provided with screw holes for attaching to wood grounds. Apron and stool can be projected if considered advisable. Scribe moulding may be used at ends of front.

$1\frac{1}{2}$ -in. extensions are furnished on all orders unless instructions are otherwise. Extensions up to  $5\frac{1}{8}$ -in. will be supplied at no additional charge.

$1\frac{1}{2}$ -in. extensions are usually used with 5B and 5C units;  $3\frac{5}{8}$ -in. with 7C and 7B units; and  $5\frac{1}{8}$ -in. with 9B2 and 9B3 units. Resulting total depths are  $5\frac{7}{8}$ , 8 and  $9\frac{1}{2}$ -in. when recess depths, including lath and plaster thickness, are  $4\frac{3}{8}$ -in.

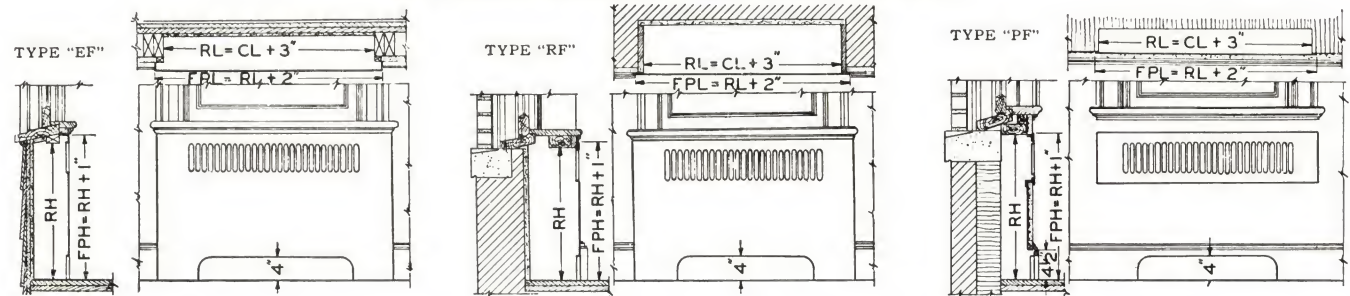
**Type "RF" Front Panels**—Shown at right, do not provide additional depth. They fit flush with plaster, and overlap top and sides of recess. Front is provided with screw holes for attaching to wood ground. Top and sides are beveled to

insure airtight joint with plaster. Scribe moulding may be used at ends of front.

**Type "PF" Front Panels**—Bottom right, are substantially the same as front of a Type "RE" enclosure, except that they are 1-in. higher at top and 1-in. longer on each end than the main body of "PE" liner, to allow for attachment to recess. In setting the "PF" Front Panel  $4\frac{1}{2}$ -in. above the finished floor and providing a 4-in. high inlet in the baseboard the same effect is obtained as with a complete "PE" enclosure. The top of the outlet grille overlaps the plaster  $\frac{1}{2}$ -in. at the top, and—when setting instructions above are followed—is in the same position as it would be in a "PE" enclosure. The top of the "PF" grille is  $\frac{1}{2}$ -in. below the top edge of the front panel. In ordering, height specified should be height of recess plus 1-in.—in which case front panel will be located  $4\frac{1}{2}$ -in. above finished floor. Four sides of outlet grille are beveled to insure airtight joint with plaster.

Screw holes  $\frac{3}{16}$ -in. diameter on "EF" and "RF" Front Panels are regularly located  $\frac{1}{2}$  in. from edge at top and sides. Countersunk holes furnished only when specified on order.

For complete information request Catalog No. 273-A.





## THE AERO CONVECTOR (Continued)

RATINGS WHEN USED WITH FRONT OR TOP OUTLET ENCLOSURES

Steam or Water Rating — Sq. Ft. — E. D. R.

Nominal convector length	** Complete enclosure length	** Front panel length	ENCLOSURE 20-in. HEIGHT						ENCLOSURE 23-in. HEIGHT						ENCLOSURE 26-in. HEIGHT						ENCLOSURE 29-in. HEIGHT						
			3B	4B	5B	*5C	7C	7B	*9B2	3B	4B	5C	7C	7B	9B2	3B	4B	5C	7C	7B	9B2	3B	4B	5C	7C	7B	9B2
10"	13"	15"	6	6	7	8	9	10	12	7	7	9	10	12	13	7	7	9	11	13	14	7	8	10	11	13	14
12"	15"	17"	7	8	9	10	11	12	14	8	8	10	12	14	15	8	9	11	13	15	17	9	9	11	13	16	17
14"	17"	19"	9	9	10	11	12	13	15	10	10	12	14	16	18	10	10	13	15	18	19	10	11	14	16	19	20
16"	19"	21"	10	10	11	12	13	14	16	11	11	13	15	17	20	11	12	15	18	20	22	12	12	15	18	21	23
18"	21"	23"	11	11	12	13	14	15	17	12	13	15	17	19	23	13	13	17	20	23	25	13	14	18	21	24	26
20"	23"	25"	12	13	14	15	16	17	19	13	14	17	21	23	25	14	15	19	22	25	28	14	15	20	23	27	29
22"	25"	27"	14	14	16	17	18	19	21	15	15	17	20	22	28	15	16	20	24	28	31	16	17	22	25	30	32
24"	27"	29"	15	15	17	19	20	21	23	16	16	18	21	23	30	16	17	21	25	30	33	17	18	23	27	32	35
26"	29"	31"	16	16	19	20	21	22	24	17	18	20	23	25	33	17	18	22	26	31	36	19	20	26	30	35	37
28"	31"	33"	17	18	20	22	24	26	29	18	19	21	24	26	35	18	19	23	28	33	39	20	21	28	32	38	40
30"	33"	35"	18	19	21	23	25	28	31	19	20	22	25	27	38	19	20	24	29	34	42	22	23	30	34	40	43
32"	35"	37"	20	20	23	26	30	33	37	21	22	24	27	29	41	21	22	26	31	36	44	23	24	31	35	41	46
34"	37"	39"	21	21	24	27	31	35	39	22	23	25	28	30	43	22	23	27	32	37	46	25	26	33	37	43	49
36"	39"	41"	22	23	26	29	34	37	42	23	24	26	29	31	46	23	24	28	33	38	48	26	27	34	38	44	52
38"	41"	43"	23	24	27	30	36	39	44	24	25	27	30	32	49	24	25	29	34	39	50	27	28	35	39	45	55
40"	43"	45"	25	25	28	32	38	42	46	26	26	28	31	33	51	26	27	31	36	41	53	28	29	36	40	46	58
42"	45"	47"	26	26	30	34	39	43	49	28	29	31	34	36	53	28	29	33	38	43	55	29	30	37	41	47	61
44"	47"	49"	27	28	31	35	41	45	51	29	31	33	36	38	55	29	30	34	39	44	57	30	31	38	42	48	63
46"	49"	51"	28	29	32	37	43	47	53	30	32	34	37	39	57	30	31	35	40	45	59	31	32	39	43	49	65
48"	51"	53"	29	30	34	39	45	49	56	32	33	35	38	40	59	32	33	37	42	47	61	32	33	40	44	50	67
50"	53"	55"	31	31	36	40	46	51	58	33	34	36	39	41	61	33	34	38	43	48	63	33	34	41	45	51	72
52"	55"	57"	32	33	37	42	47	53	60	34	36	38	41	43	63	34	35	39	44	49	65	34	35	42	46	52	75
54"	57"	59"	33	34	38	43	51	55	63	36	38	40	43	45	65	35	36	40	45	50	67	35	36	43	47	53	81
56"	59"	61"	34	35	40	45	53	57	65	37	39	41	44	46	67	36	37	41	46	51	69	36	37	44	48	54	84
58"	61"	63"	36	36	41	46	54	59	67	38	40	42	45	47	69	38	40	44	49	54	71	37	38	45	49	55	86
60"	63"	65"	37	38	43	48	56	61	69	39	42	45	48	50	71	39	42	46	51	56	73	38	39	46	50	56	89
62"	65"	67"	38	39	44	50	58	63	72	41	43	46	49	51	73	40	43	47	52	57	75	39	40	47	51	57	92
64"	67"	69"	39	40	46	51	60	65	74	42	44	47	50	52	75	41	44	48	53	58	77	40	41	48	52	58	95
66"	69"	71"	41	41	47	53	62	67	76	43	46	49	52	54	77	42	45	49	54	59	79	41	42	49	53	59	98
68"	71"	73"	42	42	48	54	64	69	79	44	47	50	53	55	79	43	46	50	55	60	81	42	43	50	54	60	101
70"	73"	75"	43	44	50	56	66	71	81	46	49	52	55	57	81	44	47	51	56	61	83	43	44	51	55	61	104
72"	75"	77"	44	45	51	58	68	73	83	47	50	53	56	58	83	45	48	52	57	62	85	44	45	52	56	62	107
74"	77"	79"	45	46	52	59	69	75	86	49	51	54	57	59	85	46	49	53	58	63	87	45	46	53	57	63	110
76"	79"	81"	47	47	54	61	71	77	88	50	53	56	59	61	87	47	50	54	59	64	89	46	47	54	58	64	113
78"	81"	83"	48	49	55	62	73	79	90	51	54	57	60	62	89	48	51	55	60	65	91	47	48	55	59	65	116
80"	83"	85"	49	50	57	64	75	82	93	52	55	58	61	63	91	49	52	56	61	66	93	48	49	56	60	66	119
82"	85"	87"	50	51	58	66	77	84	95	53	56	59	62	64	93	50	53	57	62	67	95	49	50	57	61	67	122
84"	87"	89"	51	52	59	67	79	86	97	54	57	60	63	65	95	51	54	58	63	68	97	50	51	58	62	68	125
86"	89"	91"	52	53	60	69	81	88	100	55	58	61	64	66	97	52	55	59	64	69	99	51	52	59	63	69	128
88"	91"	93"	53	54	61	70	83	89	102	56	59	62	65	67	99	53	56	60	65	70	101	52	53	60	64	70	131
90"	93"	95"	54	55	63	72	84	91	102	57	60	63	66	68	102	54	57	61	66	71	103	53	54	61	65	71	134
92"	95"	97"	55	56	64	73	85	92	104	58	62	65	68	70	104	55	58	62	67	72	105	54	55	62	66	72	137
94"	97"	99"	56	57	65	74	86	93	106	59	63	66	69	71	106	56	59	63	68	73	107	55	56	63	67	73	140
96"	99"	101"	57	58	66	75	88	94	107	60	64	67	70	72	107	57	60	64	69	74	109	56	57	64	68	74	143
98"	101"	103"	58	59	67	76	89	95	108	61	65	68	71	73	109	58	61	65	70	75	111	57	58	65	69	75	146
100"	103"	105"	59	60	68	77	90	96	110	62	66	69	72	74	110	59	62	66	71	76	113	58	59	66	70	76	149

\*Minimum enclosure height of 5C and 9B2 Units is 21-in.

\*\*These dimensions apply when piping connections are beneath convactor.

Specify Convectors by numbers, Convactor Number is a combination of type and nominal length.

For Example: A 30-in. long 3B Convactor is No. 3B30, a 30-in. long 9B2 is No. 9B230 and a 30-in. long 9B3 is No. 9B330.

For complete information request Catalog No. 273-A.



# RATINGS WHEN USED WITH FRONT OR TOP OUTLET ENCLOSURES

Steam or Water Ratings — Sq. Ft. — E. D. R.

## THE AERO CONVECTOR (Continued)

Nominal convector length	Complete enclosure length	** Front panel length	ENCLOSURE HEIGHT					ENCLOSURE HEIGHT					ENCLOSURE HEIGHT					ENCLOSURE HEIGHT								
			3B	4B	5C	7C	7B	9B3	3B	4B	5C	7C	7B	9B3	3B	4B	5C	7C	7B	9B3	3B	4B	5C	7C	7B	9B3
10"	13"	15"	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
12"	15"	17"	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
14"	17"	19"	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
16"	19"	21"	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
18"	21"	23"	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
20"	23"	25"	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
22"	25"	27"	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
24"	27"	29"	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
26"	29"	31"	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
28"	31"	33"	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
30"	33"	35"	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
32"	35"	37"	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
34"	37"	39"	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
36"	39"	41"	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
38"	41"	43"	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
40"	43"	45"	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
42"	45"	47"	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
44"	47"	49"	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
46"	49"	51"	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
48"	51"	53"	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
50"	53"	55"	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
52"	55"	57"	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62
54"	57"	59"	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
56"	59"	61"	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65
58"	61"	63"	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66
60"	63"	65"	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68
62"	65"	67"	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69
64"	67"	69"	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
66"	69"	71"	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
68"	71"	73"	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74
70"	73"	75"	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
72"	75"	77"	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
74"	77"	79"	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78
76"	79"	81"	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
78"	81"	83"	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81
80"	83"	85"	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82
82"	85"	87"	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84
84"	87"	89"	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85
86"	89"	91"	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87
88"	91"	93"	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88
90"	93"	95"	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
92"	95"	97"	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91
94"	97"	99"	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93
96"	99"	101"	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94
98"	101"	103"	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96
100"	103"	105"	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97

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For complete information request Catalog No. 273-A.



# **NATIONAL RADIATOR CORPORATION**



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**THE MARK OF QUALITY PRODUCTS**